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# JPRS Report

# Telecommunications

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# TELECOMMUNICATIONS

## CONTENTS

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DIRECTOR OUTLINES TELECOMMUNICATIONS PROJECTS

MB281418 Maputo Domestic Service in Portuguese 1030 GMT 28 Jul 87

[Text]  Mozambique's telecommunications projects, which form part of the
SADCC's regional program and are designed to improve domestic, regional, and
international communications, are currently being implemented.  This has been
disclosed by Rui Fernandes, director general of the Mozambique
Telecommunications enterprise in an interview with Radio Mozambique in Maputo.
Rui Fernandes spoke of the projects whose first and second phases of
construction are in progress.

[Begin Fernandes recording]  These projects are the first phase of the
telecommunications development project and include the rehabilitation of the
tropospheric network, the Harare-Tete-Blantyre microwave link, and the second
phase of the domestic and regional satellite network.

The first phase of the development project, which is our main project,
includes the national microwave network, the telephone exchanges in various
cities, including the national and international traffic exchange in Maputo,
and the underground cable network.  The first phase is financed by the Italian
Government, the African Development Bank [BAD], the Arab Bank for African
Economic Development, and the Swedish International Development Authority.
Work on this project will be carried out in Maputo, Xai-Xai, Chokwe, Beira,
Chimoio, Manica, Tete, Songo, Nampula, and Nacala.

The project for the rehabilitation of the tropospheric network, which is
designed to rehabilitate the various exchanges, includes the Mozambican
intercity network and is also financed by BAD.  Work on this project will be
carried out in Maputo, Beira, Tete, Songo, Quelimane, and Napula.

Another important project is the Harare-Tete-Blantyre microwave link, which is
an important element of the Pan-African Telecommunications Network, Panaftel,
and is financed by the Norwegian Agency for International Development with 15
million Norwegian kroner.  Work on this project will be in Tete city.

Finally, the second phase of the domestic and regional satellite network is
financed by the Canadian International Development Agency, CIDA.  It includes
satellite links with Malawi, Tanzania, Zambia, and Zimbabwe and will be
commissioned in 1989 following the launching of Intelsat-6.

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The first phase of the domestic network was completed in August 1986. It was financed by France's Central Bank for Economic Cooperation and the Kuwait Fund and has permitted the establishment of automatic communications between Maputo, Beira, and Nampula. The first phase of this project is being studied and CIDA will finance it. The domestic satellite network is scheduled to cover other Mozambican cities. [end recording]

/12913
CSO: 5500/063

DATA COMMUNICATION NETWORK TO BE ESTABLISHED

Dakar LE SOLEIL in French 3 Jun 87 p 8

[Article by Paper Mor Sylla]

[Text]  The various data processing circuits existing in our country will
be standardized next year, thanks to activation by the National Telephone
Company (SONATEL) of a national data transmission network.

The system, which will allow us to link up most of the computers installed in
government services, semi-public and private companies, has already moved into
a decisive phase of implementation with bidding requested by SONATEL for the
supply of equipment.

With this network the circulation of processed data will be more flexible.
For example, a company in Dakar will thus be able to "communicate" with its
regional branches while companies of the same professional category will be able
to exchange data without having to hook them up to foreign data processing
circuits.  This will involve a piece of equipment serving to transmit,
flexibly, processed data and at a cost much lower than at present in which the
telephone complements the computer in several companies.

But to prepare the people charged with implementing this new technique, the
Organization and Methods Office (BOM) since Monday has been holding a training
class in networks and coummunication techniques at Saly Portudal jointly with
SONATEL and CEPIA from Paris.

Users Test

Opened by the chief of the office for communications, Mr Mouhamadou Cheikh Kane,
in the presence of BOM and SONATEL managers, the class brings together agents
from 17 services and companies selected by our telecommunications company to take
part in what it calls the "test user group."  In the public sector it includes
the BOM, the  Directorate of Automatic Data Processing in the Ministry of Economy
and Finance, the Directorate of Data Set Automation in the Interior Ministry,
the National Center of Scientific and Technical Documentation, the Directorate
of Scientific and Technical Affairs in the Ministry of Plan and Cooperation and
the university-level advanced school of technology.

Vis-a-vis the semi-public sector, there is SONATEL, the autonomous port of
Dakar, the Senegalese Radio and Television Service, the OPCE and
Senegal Electric, while the General Banking Company, the Senegalese Internal
Bank of Commerce and Industry, Laborex, Senegalese Data Processing (SENI)
and construction firms such as Bull and IBM represent the private sector.

Through the unification of the data processing circuit of this conglomerate
of companies and public and private services, SONATEL will thus test
the reliability of its equipment, which will constitute a major action in
the application of government policy in the communication field. This policy
is a bet which will be won, according to Mr Mouhamadou Cheikh Kane, despite
the difficulties of the present situation limiting our wherewithal.

Far from being a matter of mimicry, this data transmission network is rather,
according to Mr Pathe Ndiaye, the head of BOM, the result of long, hard
thinking by the telecommunications coordinating committee and the national
data processing committee stemming from the decision by the president of the
Republic to integrate data processing and telecommunications. Noting the
unevenness in telecommunications technology development, the head of BOM
finally came up with the weighty mission to be passed on to the pioneers of
the future national data processing network.

For 6 days the trainees who are computer personnel, officials and decision
makers in their various services and companies will acquire knowledge in the
field of communications and telematics. They will study principles of
communications and data through the various networks before they get into
the organizational and functional elements to be considered in setting up
data processing networks.

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CSO:  5500/52

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CONTRACTS SIGNED TO UPGRADE NAVAL COMMUNICATIONS

Coast Guard NAVLINK System

Ottawa THE OTTAWA CITIZEN in English 28 Jul 87 p B3

[Article by Vivian Bercovici]

[Text]

Skywave Electronics Ltd. of Kanata has signed an $82,000 contract with the Coast Guard to develop an improved communications system for its helicopters and ice breakers.

Peter Rossiter, vice-president of Skywave, explained that a high frequency radio system, known as NAVLINK, will transmit location information between ships and helicopters at a rate of 300 bits per second.

Every minute, this information will be updated. With the equipment now in use, ships and helicopters make less frequent radio contact, sometimes with lapses in communication as long as 10 minutes.

Coast Guard spokesman Terence Melhuish said that NAVLINK will greatly increase the distance that helicopters can fly from ships without losing contact, to 80 nautical miles from the present 20.

If field tests are successful, the system will be installed on about 17 of the Coast Guard's 55 ships, starting with its seven ice-breakers.

According to Melhuish, 30 Coast Guard vessels can land helicopters, but only its navigational aid vessels and ice-breakers are equipped with full flight decks and hangars.

Navigation ships maintain floating and stationary aids at sea, like buoys, transit markers and beacons. On ice breakers, helicopters fly out ahead of the ship to chart the best course to follow.

Most ships to be outfitted with NAVLINK will operate in the St. Lawrence Seaway, on the east coast and in the Arctic. Two west coast vessels will also have NAVLINK installed, said Melhuish.

Rossiter hopes to apply the technology to other radio and communications equipment.

NAVLINK will be fully operational in November, when Skywave personnel will test it on board Coast Guard ships.

Rossiter also intends to market the system in the U.S., the United Kingdom and to the Canadian military.

Shipboard SHINCOM System

Ottawa THE OTTAWA CITIZEN in English 30 Jul 87 p C9

[ARticle by Kathryn May]

[Text]

Ottawa's Leigh Instruments Ltd. has been awarded a $14.5-million contract to

replace obsolete communications systems in the Canadian Armed Forces' four Tribal Class destroyers.

The contract calls for Leigh to manufacture interior communications systems for the four destroyers, which are currently undergoing a $829-million overhaul by Litton Systems Canada Ltd. for the Department of National Defence.

The Shipboard Integrated Interior Communications System (SHINCOM) is basically a sophisticated telephone exchange, which integrates the ship's voice communications in one central system, making it more efficient and secure than the existing 15-year-old system.

This is the third major government contract won since last August by Leigh Instruments, which has put on a growth spurt in recent years.

The company has hired about 200 employees in the last two years. This contract will create another 170 person years' work — the equivalent of 40 workers.

A spokesman for the department's Tribal Class Update and Modernization Program (TRUMP) said the biggest advantage of the SHINCOM system is that the commanding officer can talk to the various ship stations simultaneously.

The new system will take up less space than the old system. It will also be much lighter and will eliminate the growing repair and maintenance costs of the existing system.

The systems will be built at the company's Carleton Place plant. At the same time, Leigh's facility on Queensview Drive in Ottawa will work on reducing the size of the SHINCOM system for use in smaller ships and submarines.

Leigh developed and tested SHINCOM under contract for the department in 1982. It actually began producing the system about a year ago when it won a $23.2-million contract to supply SHINCOM for DND's six new patrol frigates.

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CSO:   5520/41

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# PARTNERSHIP SET TO PROVIDE ASIAN SATELLITE SERVICE

Toronto THE GLOBE AND MAIL in English 30 Jul 87 p B5

[Article by Lawrence Surtees]

[Text]

Pacific Star Communications Corp. of Vancouver says it has formed a consortium, whose members include Telesat Canada and a company owned by Hong Kong financier Li Ka-shing, to provide satellite service throughout the Pacific Rim.

The four partners in the group are Pan Am Pacific Satellite Corp., British Telecom PLC, Telesat Canada International Inc. and Hutchison Telecommunications Ltd. of Hong Kong.

Representatives of each partner are preparing a business plan to determine whether it is economically feasible to launch the service, according to a statement from Pacific Star.

Harry Kowalik, vice-president of space systems at Telesat, confirmed its participation in the venture and said the studies should be finished in the fall. Telesat is Canada's domestic communications satellite operator.

Pan Am Pacific, which proposes to operate the Asian satellite service, is a joint venture between Pacific Star's Johnson Geneva (USA) Ltd. subsidiary and New York-based Pan Am Corp.

Pacific Star has stated it wants to begin the new service by the middle of next year.

The company is the brainchild of Michael Johnson, chairman and founder of Johnson Geneva.

Johnson Geneva has obtained the rights to buy the Westar VI satellite from a group of insurance underwriters at Lloyd's of London who paid to salvage the unused satellite when it failed to get into a proper orbit in 1984.

If Johnson Geneva exercises the option, Pan Am Pacific will pay $20-million (U.S.) over 14 months to buy the Westar VI satellite. A new communications satellite would cost at least $100-million.

Pan Am Pacific has also been negotiating with Telesat to buy or lease a spare Anik C satellite currently in orbit more than 36,000 kilometres above the equator.

The consortium presents potential competitors with a team with unrivalled financing and technical expertise, even though it is a departure for three of its members.

Hutchison Telecommunications, a subsidiary of Mr. Li's trading house, Hutchison Whampoa Ltd., is making its first venture in satellite communications. It wants to expand its telecommunications business and is aiming to obtain a piece of what could be a lucrative market for satellite services. Robin Maule, group director of planning at Hutchison, told the South China Morning Post that the market study should be finished in three months and results indicate a substantial potential for a two-satellite system.

British Telecom is conducting the market studies and participation by it would expand its international presence into Asia.

Although Telesat has had some international consulting contracts, it has not participated in offering service to countries outside North America.

If feasible, the Westar VI satellite would be refurbished and fired back into orbit next May aboard a Chinese Long March rocket.

Telesat's Mr. Kowalik said the Anik C-1 satellite, which has never been used, will also be moved to a new orbit position. He said Telesat's role in the Pacific Star venture will be in operating the satellites and planning the networks.

Telesat has not yet decided whether it will sell the spare Anik C, which it earlier attempted to sell for $80-million (U.S.), or lease its 36 channels for an annual fee.

With both satellites in place, Pan Am Pacific has stated it could serve China, Hong Kong, Singapore, Taiwan, Thailand, Indonesia, the Philippines, Malaysia and South Korea.

Pacific Star's proposal will be subject to approvals from Intelsat, a Washington-based international organization that provides a global satellite service.

/9274
CSO: 5520/41

# MACDONALD ANNOUNCES NEW TELECOMMUNICATIONS POLICY

## Two Classes of Carriers

Toronto THE GLOBE AND MAIL in English 23 Jul 87 pp B1, B]

[Article by Lawrence Surtees]

[Text]

Critics and some industry players are attacking Flora MacDonald's new national telecommunications policy as shallow, deficient and premature.

Miss MacDonald, the federal Communications Minister, said yesterday's announcement, which will create two classes of telecommunications carriers, is "the first comprehensive statement of telecommunications policy by a federal government since the early 1970s."

But industry groups and consumers, who have been waiting since the seventies for clearer rules on competition and regulation, still must wait for the negotiation of a federal-provincial agreement on telecommunications.

The policy lacks many details because it is subject to agreement with the provinces and it will require legislation to be introduced in Parliament.

Ottawa failed to complete an agreement with the 10 provinces after two days of talks in Edmonton on April 2 and 3. The communications ministers will meet again in September for further discussions in a bid to develop a single set of rules to govern access to telephone company networks, ownership of telephone sets and co-ordination of regulatory agencies.

"Why is she announcing this on July 22?" asked New Democratic Party communications critic Howard McCurdy (Windsor-Walkerville).

The eight-page policy "framework" released by Miss MacDonald says the federal Government will:

● Designate the 10 member telephone companies of Telecom Canada, Telesat Canada, Teleglobe Canada and CNCP Telecommunications as Type 1 carriers. These will be the only companies that can own and run interprovincial and international communication networks;

● Create rules to let Type 2 carriers provide services that are based on facilities leased from Type 1 carriers; and

● Limit foreign ownership in Type 1 carriers to 20 per cent, except for those carriers that are currently controlled by foreign companies.

The policy paper says the measures are "intended to encourage" the development of new services "of interest to the business community."

But an official at the Canadian Business Telecommunications Alliance, which represents business telephone users, disagrees. "I don't think these rules really do a lot for business users and I wonder why the minister is announcing a policy

now," said John Davies, CBTA executive director.

,- The definitions of Type 1 and 2 carriers also ignore the more than 150 independent telephone operators, said Kenneth Engelhart, CBTA general counsel.

But Mr. Engelhart said the legislation will go beyond protecting the status quo. "It will guarantee the telephone companies' monopolies, which is something Parliament has never done before," he said.

He also said the policy will prevent large businesses from owning their own private network equipment, contrary to trends in other industrial countries.

Graeme Hughes, president of the Information Technology Association of Canada, said the policy leaves many questions unanswered, despite years of study by the federal Department of Communications.

"The whole question of competition in long-distance telephone service has been left for further discussion. We'd like to see an accelerated review of this important issue."

Andrew Roman, general counsel for the National Anti-Poverty Organization, said the policy has nothing for the residential consumer or small business user. "It sets the stage for compulsory access to telephone company networks by new entrants offering special services that only benefit a few users, but

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will lead to more regulation, higher prices and decreased efficiency for all others."

A senior official at CNCP, which lost its bid in 1985 to provide competitive long-distance service in Canada, was less critical.

"I welcome pronouncements on telecommunications because there are so few of them," said Joseph Schmidt, vice-president of regulatory and governmental matters. But he expressed concern that the policy "lacks specifics on long-distance competition, dates, times and places."

## Foreign-Ownership Limits

Ottawa THE OTTAWA CITIZEN in English 23 Jul 87 p B9

[Article by Norman Provencher]

[Text]

Canada's telephone companies and provincial communications ministers have reacted cautiously to federal Communications Minister Flora MacDonald's plan to impose foreign-ownership limits on the national telecommunications companies, while encouraging competition among smaller operators.

"It seems to be a little more detailed than I had expected, but we have a meeting scheduled for the fall with all the communications ministers and I'm sure we can handle any problems," Alberta Communications Minister Les Young said Wednesday.

In attempting to standardize telecommunications regulations across the country, MacDonald's proposals would override many existing provincial regulations.

But MacDonald and spokesmen for other communications ministers said the federal plans were accepted in principle at a meeting in Edmonton earlier this year.

"The ministers discussed the proposals (Tuesday) and there seemed to have been agreement," said Jean-René Marchand, an aide to Quebec communications minister Richard French.

"We can't say if we agree to everything, but the principles seem acceptable."

A spokesman for B.C. Telephone — which is 50.6-per-cent owned by U.S.-based GTE Corp. through a Canadian holding company — said the policy proposals seem "designed to stem future problems rather than correct any glaring difficulties now."

"With more and more deregulation going on, and widened investment from the U.S. (and) British Telecom, for example, the minister probably thought it was a good idea to have some ownership safeguards set down," said Jocelyne Côté-O'Hara, B.C. Tel's director of government relations.

B.C. Tel and its sister company Quebec Telephone, which operates in some rural areas of Quebec, are to be exempted from the 20-per-cent foreign ownership limits MacDonald proposes for the big companies that supply basic telephone service.

MacDonald said the measures were part economics and part "national security. No country allows foreign ownership of its basic communications systems, and neither will we."

The provincial phone companies belonging to the Telecom, Telesat and Teleglobe systems, and CNCP Telecommunications, are all to be designated "Type 1" carriers, the only sort allowed to operate a national system.

MacDonald said smaller companies — sometimes called "interconnect" companies — which rent facilities from the majors, will be encouraged to develop new commercial services as well as straight telephone service.

These would range from cellular telephones and specialized information bases available over the telephone to more exotic services and products, such as an at-home wine-buying service.

She conceded that the new competition will felt more outside of Ontario and Quebec, where telecommunications systems have been increasingly de-regulated over the past few years.

Deregulation has spawned a "$300 million worth of new business last year alone," said MacDonald, referring to the growing cellular telephone market and other telecommunications services, particularly information systems used in business, in Quebec and Ontario.

"With the variety of regulations (we) have some areas which are information-rich and others which are information-poor," said MacDonald.

The policy changes will have no effect on residential phone rates, she added.

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CSO: 5520/41

TELESAT TESTING REMOTE SATELLITE TELEPHONE SERVICE

Ottawa THE OTTAWA CITIZEN in English 24 Jul 87 p A13

[Article by Greg Ip]

[Text]

Telesat Canada has begun testing a satellite phone hookup between two Northern Ontario mining camps and their Toronto head offices, in hopes of eventually offering the service to all companies with remote business sites.

The three-month test began Wednesday, linking Muscocho Explorations and Canamax Resources Inc. with their gold mining camps near Wawa.

Maritime Life Assurance Co. is also testing the system between its Halifax head office and Toronto branch.

"Telephone service doesn't go into every mining camp or oil exploration centre," said Linda Rankin, Telesat's vice-president of telecommunication services. "Up to now, they've had to use radio. This allows for the same or better grade of long distance telephone service ... you'd get in the locally serviced area."

Paul Parkin, market planner for Ottawa-based Telesat, said the radio-telephone system now in use in the camps is inconvenient because it can take hours to get a line free and often requires going through several operators.

Telesat's remote satellite communications service is using satellite equipment made by Microtel Ltd. of Vancouver, which has already supplied the equipment for similar systems to phone companies in the four western provinces.

To communicate, a caller at the camp dials a number at the camp's mobile earth station, which sends the signal to the Anik C2 satellite. This in turn retransmits the call to Telesat's teleport facility in Toronto, and thence into the phone system.

Rankin said the Microtel equipment is clearer and cheaper than the equipment currently used for Telesat service to northern communities because it operates at a higher frequency, the 14/12 gigahertz Ku-band.

The older equipment operates at the 6/4 GHz C-band.

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CSO: 5520/41

MICROWAVE-FUELLED PLANE PROTOTYPE TO BE TESTED

Ottawa THE OTTAWA CITIZEN in English 28 Jul 87 pp A1, A2

[Article by Anne McIlroy]

[Text]

A team of Ottawa scientists is poised to be the first in the world to launch a plane powered by microwaves, or beams of energy sent from the ground.

And if not for one hungry mouse, they might already have made the record books with their pilotless, balsa-wood plane.

Remote-controlled and equipped with a special receiving antenna, it turns microwave energy into direct current for an electric motor and propeller.

The great thing is, it doesn't have to carry fuel, says Ronald Barrington, director-general of radar and communications technology at the Department of Communication's Research Centre in Shirley's Bay, just west of Ottawa.

Shaped like a glider, the prototype is about one-eighth the size of the plane that may eventually fly in a tight circle somewhere above Canada.

The full-size plane would fly 20 kilometres above the earth, and would stay up for months.

Designed to act like a low-flying satellite, it could be used to transmit radio and television signals over a far wider area than can be reached using a transmitting tower, at a far lower price than a satellite, says Barrington.

It would also be able to carry radar equipment, and could be used for surveillance, possibly to monitor ships in Canadian waters off the Atlantic coast, he says.

Yet another application would see the plane monitoring pollution levels.

About a month ago the small prototype — the result of five years' research — was just about ready for launch, Barrington says.

Then a mouse broke into a small hangar in a field behind the centre and chewed its way through part of the plane's wooden frame.

The plane is now being repaired. Launch should come within six weeks, he says.

It is the first prototype from a federal research program known as SHARP, or Stationary High-Altitude Relay Platform. So far, more than $2 million has been spent.

This small version — its wing span is roughly twice the length of the human arm span — was built to prove that microwave-fuelled planes can work, says Barrington.

As it flies in its circular path, a satellite dish on the ground follows the plane, beaming up microwaves which are converted into electricity to drive the airplane's motor.

It is comparable to a radio, where a receiver picks up radio waves sent out from a distant transmitter.

Microwaves are very short radio waves that can be focused into narrow beams.

If all goes as well as possible on the project and funding continues, an intermediate-size model could be built in two years and a full-sized plane could be ready in four, says Barrington.

The intermediate model would be one-third the size of the full-scale plane, would fly three kilometres above the ground and stay up for two to three weeks, breaking the world record for endurance flying, says Barrington.

So light it can be launched by hand, the prototype will be hurled into the air by a scientist on the team who happens to be a good runner, says project manager Joe Schlesak.

Then, for 10 minutes, it will soar about 100 metres above the ground — higher than a 30-storey building.

Although other agencies, including the U.S. National Aeronautical and Space Administration, are studying microwave-fuelled planes and space vehicles, no one has yet built a demonstration model.

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CSO: 5520/41

NORTHERN TELECOM INTRODUCES NEW TELEPHONE SWITCHING SYSTEM

Ottawa THE OTTAWA CITIZEN in English 8 Jul 87 p G1

[Text]

TORONTO (CP) — Northern Telecom Ltd. introduced a major new telephone switching system Tuesday that the company says puts it well ahead of it competitors, most notably the U.S. telecommunications giant American Telephone and Telegraph Co.

The new digital switching system, called the DMS-SuperNode, will increase the capacity, capability and flexibility of the public telephone companies worldwide that use Northern Telecom equipment, said vice-president Arthur MacDonald.

Toronto-based Northern Telecom, 52-per-cent owned by Bell Canada Enterprises, is the only telecommunications manufacturer able to offer such a capability, MacDonald told a news conference.

The DMS-SuperNode "significantly raises the ante in our industry by placing Northern Telecom in a technologically superior position to other suppliers."

The Toronto stock market concurred, pushing Nortel shares up $2 to $30.125, its highest level in a year.

But MacDonald made no grand projections about what the new system will mean to Nortel's bottom line or its current worldwide employment level of 46,000.

Nortel reported net earnings of $313.2 million on revenues of $4.38 billion in 1986 compared with earnings of $432.0 million and revenues of $4.26 billion in 1985. But operating earnings slipped slightly to $414.0 million in 1986 from $422.1 million in 1985.

Householders will also see benefits from the new system.

The DMS-SuperNode will be abe to provide customers with automatic re-dials — that is if a caller dials a number and gets a busy signal the new system will re-dial the number as soon as the first call hangs up, MacDonald said.

The system can also translate a telephone number into a name, allowing customers to identify callers and screen incoming calls, he said.

The increased capacity the system provides will encourage the use of the telephone system for such things as home shopping services, telemetering and home security services, said Tom Law, an analyst with Nesbitt Thomson Deacon Inc. in Montreal.

Law also thinks the new system will permit Northern Telecom to increase its market share.

Currently, Nortel has about 40 per cent of the central office telephone market in the United States — about the same as AT&T, but Law believes the DMS-SuperNode will put Nortel into the lead.

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CSO: 5520/40

ACHIEVEMENTS IN CHEMICAL INDUSTRY, COMMUNICATIONS

OW230804 Beijing XINHUA in English 0725 GMT 23 Jul 87

[Text] Beijing, 23 Jul (XINHUA)--China's chemical industry as well as its postal and telecommunications service have achieved good results in the first half of this year, according to today's overseas edition of the PEOPLE'S DAILY.

The newspaper said that although China suffers shortages in raw materials, electric power and funds, the total output value of its chemical industry in the first half of 1987 reached 29.3 billion yuan. This is 52.8 percent of its annual target which was set at 55.5 billion yuan. The industry's second quarter figures show a 15.8 percent increase over the same period last year.

The PEOPLE'S DAILY said the output of 16 major products under the state plan exceeded 50 percent of the year's total planned output. The output of chemical fertilizer, for instance, reached 39.65 million tons in the first 6 months, 52.9 percent of the planned output for this year.

At the same time, the paper said, China's postal and telecommunications service earned 2.296 billion yuan, a 27.8 percent increase over the same period last year.

During this period, the paper added, China installed 3,813 more long distance telephone lines and opened long distance automatic switchboards in Harbin, Nanchang, and Taiyuan, bringing the number of cities with long distance automatic switchboards to 21. China now has more than 50 thousand long distance telephone channels. Meanwhile, China installed 240 thousand telephones in cities, 126.9 thousand of which are program-controlled.

/9599
CSO: 5500/4168

CHANNEL DIGITAL MICROWAVE SYSTEM OPERATING

HK270955 Beijing CHINA DAILY in English 27 Jul 87 p 3

[Article by staff reporter Wang Xingcun]

[Text]  Foshan, Guangdong--The first Chinese-made 480 channel digital microwave communications system formally began operation on Saturday in Guangdong Province after a successful 34-day trial, an official of the Ministry of Post and Telecommunications announced here.

Qiu Jiaqin, general manager of the country's giant Post and Telecommunications Industry Corp. (PTIC), said at a press conference on Friday evening that the successful launch of this system "marks an end to the importation of digital microwave equipment below 480 channels."

According to a regulation issued by the State Economic Commission, the central government will no longer approve imports of equipment China can make.

Completion of the system--which links the cities of Foshan, Zhongshan, and Jiangmen, and Shunde County in the western part of the Zhujiang Delta--also means that the nation's post and telecommunications industry has entered a new stage in digital microwave communication, Qiu said.  And it will pave the way for a 1,920 channel system elsewhere, which will rank among the most advanced in the world.

The 96-kilometre-long system is a co-operative project between the Guangdong Provincial Post and Telecommunications Bureau (GPPTB) and the PTIC.

Cui Xun, deputy director of the GPPTB, said the total cost of the project, which involves four retransmission stations, was 2.8 million yuan ($760,000).

Only the stations at Foshan, Zhongshan, and Shunde are in operation because the construction of Jiangmen station apparatus building will not be completed until next month, he said.

The contract was signed last December.  The Microwave Communication Equipment Factory, chief builder of the system and producer of its key equipment, started test operation on 22 June.

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The factory gave the key of the project to the user on Saturday.

During the test period, the system proved highly profitable.

Qiu said that by using it, the telecommunication offices in Foshan, Shunde, and Zhongshan got more than 30,000 yuan in business a day. That means the investment could be returned within 3 months, he said.

Cui Xun said the system cost only a third of what an imported one would cost.

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CSO: 5500/4168

CHINA TO GAIN MODERN TELECOMMUNICATIONS TECHNOLOGY

HK290407 Hong Kong HONGKONG STANDARD (HONGKONG STANDARD BUSINESS) in English 29 Jul 87 p 3

[Article by Sofia Morgan]

[Text]  Mainland China's obsolete telecommunications industry has received a shot in the arm following the signing of a high technology transfer contract last Saturday.

Ten telephone factories from around the country were approved late last year to import advanced telecommunications technology in a bid to upgrade the outdated industry.  The deal was the first to be concluded with any of these permitted parties, said a reliable industrial source.

According to the deal signed with Guangzhou's Yue Xiu Enterprise, Hong Kong's ABM industries will transfer the technology of making analogue PABX (private automatic branch exchange) systems to Guangzhou Wire Communication Equipment Plant, a subsidiary of Electronics Import and Export Corp.

The plant, which has been making simple telephones and switching systems, will make PABX systems ranging from 4 to 102 extensions solely for domestic consumption.  Production will start this year.

Apart from the technology transfer which costs $2.5 million, the contract also stipulates that the Guangzhou factory buy strategic components--reported to cost a far more substantial amount--through ABM for the next 3 years.

The Guangzhou plant agreed to purchase components for at least 20,000 extensions annually, although its production capacity stands at 30,000 extensions.

Developing China's ancient telecommunications network and overhauling existing systems receives top priority in the mainland's current 7th 5-Year Plan (1986 to 1990).

Most if not all of the other nine approved telecommunications technology importers are believed to be negotiating for similar transfers.

However, according to the industry source, such overseas giants as ITT, AT&T, NEC, and Fujitsu often expect large-sum contracts which the Chinese parties may not be willing to come to terms with.

ABM, a fast growing electronics manufacturer, started making computers 3 years ago. Its analogue PABX unit won a prestigious local industrial award last year, and the company is developing a digital PABX system, expected to be Hong Kong's first when completed.

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CSO: 5500/4168

SHANGHAI TELECOMMUNICATIONS BUILDING NEARS COMPLETION

HK291232 Hong Kong ZHONGGUO XINWEN SHE in Chinese 0125 GMT 28 Jul 87

[Text] Shanghai, 28 Jul (ZHONGGUO XINWEN SHE)--The principal part of the Shanghai telecommunications building, which stands in the southwestern corner of the People's Square in the central part of Shanghai, has now been completed. The tops of the auxiliary buildings including the airconditioning room have also been sealed. The telecommunications building will receive customers beginning 1 October.

The construction of the Shanghai telecommunications building started in September 1982. It covers an area of 46,000 sq m. The most advanced telecommunications equipment will be installed in the building, including 400 program controlled international telephone exchanges imported from Belgium; 4,000 program controlled domestic telephone exchanges imported from Sweden; terminal equipment for the Pacific communications satellite; short-wave terminal equipment; and terminal equipment for the Sino-Japanese submarine cable.

With the completion of the Shanghai telecommunications building, the number of telephones from which automatic dialling can be made, from Shanghai to other major cities in the country, will increase from 300 to 20,000.

All the projects in the telecommunications building will be completed and put to use by the end of this year.

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BRIEFS

TIANJIN BUILDING TELECOMMUNICATIONS CENTER--Tianjin, 23 Jul (XINHUA)--A complete telecommunications network linked with 180 Chinese cities and 39 counties is taking shape in the Tanggu District, the site of two oilfields near the north China port city of Tianjin, XINHUA learned today. A 10,000-channel switchboard and a system of 600-line program-controlled long-distance telephone exchanges, imported from the Nippon Electric Corp., have officially been put into operation, said an official from the local telecommunications bureau. A project to install more than 1,000 double-track cable lines linking Tanggu with the Tianjin economic and technological development zone has also been completed. The local telecommunications department has also begun radio tracking, radio facsimile, and phototelegraph services. [Text] [Beijing XINHUA in English 0201 GMT 23 Jul 87] /9599

CSO: 5500/4168

FOUR COMPANIES APPLY FOR MOBIL TELEPHONE LICENSE

Hong Kong SOUTH CHINA SUNDAY MORNING POST in English 19 Jul 87 p 4

[Article by Carolyn Leung]

[Text]

FOUR telecommunications companies — Chinatel, Hutchison Telephone, Star Paging and Ericsson — have submitted formal applications to the Government for the fourth licence to operate a public mobile telephone service in Hongkong.

The existing mobile telephone licences are held by Chinatel, Hutchison Telephone and a Hongkong Telephone subsidiary, CSL.

About 16 companies submitted letters of interest to the Government's Telecommunications Authority earlier this year when it invited tenders for the fourth licence.

Among these were British Telecom, Elekon, Draco International, Wellson Service and Pacific VHF Workshop.

The Government is expected to announce later this year which of the four companies still in the running has won the licence.

One formal applicant, Star Paging, is acting on behalf of an unknown China-backed operation with the intention of capturing the lion's share of the mobile telephone market in Hongkong and China.

"If we are granted the mobile telephone licence, we will sign roaming contracts with various telecommunications stations in China.

"That means, Hongkong travellers can link their mobile telephones to China's telecommunications networks immediately and enjoy various services such as IDD," said Mr Wong Kam-fu, managing director of Star Paging.

According to Star Paging's plan, subscribers of their mobile telephones will have to pay extra fees if they want their telephones linked to China's telecommunications networks.

"It shouldn't be too diffi-

cult to secure roaming contracts with China's telecommunication stations if we can bring them foreign exchange," said Mr Wong.

However, this masterplan will be ruined if Star Paging fails to win the licence from the Hongkong Government. In addition, the company has to come to terms with China on a few essential areas in order to ease the telecommunications barriers between Hongkong and China.

"At present, China doesn't allow any imports of radio-telephone products. We will do something about that once we have won the licence," said Mr Wong.

Star Paging is optimistic in its bid for the fourth mobile telephone licence. In fact, the company and its unknown Chinese partners have decided to invest $150 to $200 million to implement their plan to capture the mobile telephone market in Hongkong and China.

/9317
CSO: 5550/0195

DISH ATOP NCNA HONG KONG OFFICES DEEMED LEGAL

Hong Kong HONGKONG STANDARD in English 27 Jul 87 p 1

[Text]

THE giant dish antenna that has appeared on the top of a building at 387 Queen Rd East is, the postal authorities say, being used for "overseas telecommunications purposes". Thereby hangs a tale.

The building is, you see, the headquarters of China's *Xinhua* news agency.

Despite dark thoughts that may lurk in the territory's more suspicious minds, however, there's nothing fishy going on — as far as the Hongkong authorities are aware.

The big concave structure is there, not to send or receive secret messages, but for the pleasure and information of the agency's staff.

*Xinhua's* propaganda chief, Mr Zhang Junsheng, explained: "The dish enables us to watch programmes beamed by the China Central Television (CCTV) station.

"Our staff is largely seconded from China. They like watching these programmes. For instance, they may watch live coverage of sporting events such as volleyball matches.

"Also, because we have to be in constant contact with our counterparts on the mainland, we have to keep abreast of the latest developments there."

The Queen's Road East building is tall enough for conventional antennae to pick up TV signals from Guangdong and Shenzhen — but the reception is poor.

Since the dish went in two months ago, Mr Zhang said, reception from these areas had improved remarkably — and staff could watch programmes from the capital, too.

He said clearance was obtained from Cable and Wireless for the installation.

"Any suggestions that we were given 'privileged treatment', such as licence exemption, are unfounded," he said.

Said a General Post Office spokesman, answering questions from *The Standard*: "As far as we are aware the *Xinhua* news agency uses the facilities provided by Cable and Wireless for overseas telecommunications purposes."

The Post Office reply said no organisation, news agency or diplomatic mission, was licensed to operate its own private telecommunications facilities.

/9317
CSO: 5550/0194

TELECOMMUNICATIONS NEED FOR COMPETITION CONSIDERED

Television Needs Reviewed

Hong Kong SOUTH CHINA MORNING POST in English 31 Jul 87 p 5

[Text]

CONSULTANTS to review the start of cable television in Hongkong and whether a second telecommunications network is needed are expected to start work soon.

Earlier this month the Executive Council decided independent consultants would be best to consider such a complex issue.

A Government source said no definitive short list had been drawn up so far although the Government was aiming to appoint a consultancy firm by early September.

He said: "The consultancy will be rather broad-based, covering telecommunications matters, economic issues and implications for public disruption. The consultants should have appropriate breadth of expertise and experience in telecommunications development worldwide."

The decision to appoint consultants sparked criticism because of the delay it would mean in granting cable television licences.

In addition to examining cable television, the consultants will also consider whether a second telecommunications network should be given the go-ahead, thereby breaching Hongkong Telephone's network monopoly.

Hongkong Telephone's cable television consortium, Cable Television Hongkong, has been critical of the decision to lump the two issues of cable television and a second network together.

# Results of Users Survey

Hong Kong SOUTH CHINA MORNING POST in English 21 Jul 87 p 1

[Article by Joel McCormick]

[Text]

AN independent telecommunications authority and the introduction of competition would better serve Hongkong, according to a user survey released yesterday.

Findings were gleaned from only 34 questionnaire responses.

Normally, that would not be considered a significant number except that some of the respondents were senior executives of corporations with large communications billings, including Reuters and Cathay Pacific.

At the inaugural meeting of the Hongkong Telecommunications Users' Group (HKTUG), a member of the executive committee, Mr Phil Arnett of Reuters, said his annual communications billings had reached $40 million.

HKTUG chairman, Mr Roger Garner, conceded the sample was small but said it represented 50 per cent of the people who attended the group's first meeting. "I was well pleased with the response," he said. "In Hongkong, it does take a lot to get people to have a view."

He said a 10 per cent response was considered very good.

A press announcement dealing with the survey results said they showed that many more users were dissatisfied than satisfied with current services.

"Fifty per cent more users were not satisfied with telecommunications services than were satisfied." the announcement said.

The Managing Director of Cable and Wireless (HK), Mr Greg Crew, declined to comment on the findings until he could review the results first hand.

Mr Crew said he would like to see specific instances of user dissatisfaction, suggesting that a general statement of dissatisfaction was not much for him to go on.

The survey also showed that use of services would increase dramatically if tariffs were reduced.

"Four hundred per cent more users said they would utilise more services if tariffs were reduced than wouldn't," the announcement said.

"An overwhelming majority (of survey respondents) believe open competition would benefit Hongkong business and that communications was important to their business."

The survey of participants at the meeting, which drew more than 75 to the Hilton Hotel on July 10, also showed that most users surveyed wanted an independent communications watchdog.

"Ten times more users believe that an independent telecom authority should be created rather than continuing with the present system," yesterday's announcement said.

"Four times as many users believed that an independent organisation should be established to provide Permission To Commission (PTC) approval."

Organisers also said the survey results supported the move to create the new telecommunications lobby. "Respondents were unanimous in their belief of the need for HKTUG and in the involvement of users in telecommunications policy creation," the statement said.

HKTUG, as distinct from TUGHK, an off-shoot of the Hongkong Management Association (HKMA), was formed after members of the original HKMA affiliate found the parent association would not endorse their views on competition in the cablevision field.

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CSO: 5550/0193

NEW ISLE OF YOUTH TELEVISION SERVICE

FL140137 Havana Television Cubana Network in Spanish 0000 GMT 14 Aug 87

[Text]  For the first time in history, the residents of Isle of Youth and the thousands of Third World students who study here have a territorial television signal.

The new television center [video shows logo of antenna with satellite dish and the words "Isla Vision"], which can now be added to the six that are operating in the country, is the realization of an idea proposed by the commander-in-chief in the main report of the third congress of the Communist Party of Cuba.

During the first stage, Isla Vision will be broadcast 1 hour every week and will carry informational-cultural programming.  It will be broadcast daily by the beginning of next year.

The center's 41 workers, whose average age is 22, have pleged in a letter to Fidel to work with quality and, when necessary, in order to realize the ideas expressed by the chief of the revolution on the informational, recreational, and cultural functions a television center should perform on the Isle of Youth.

Equipped with the most modern television technology, Isla Vision's inaugur- ation is in response to a need which has existed for many years because of the accelerated social-economic development of this piece of Cuban territory, which now accommodates more than 20,000 Third World students.

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 CSO:  5500/2049

TEXT OF TELECOMMUNICATIONS LAW

PA170133 Panama City LA ESTRELLA DOMINICAL in Spanish 16 Aug 87 pp 18-a, 19-a

[Law No 14 of 29 July 1987 issued in Panama City on 26 July; reprinted from the OFFICIAL GAZETTE of 6 August]

[Text]  Law No 14 of 29 July 1987

For the regulation of national and international telecommunications in the Republic of Panama.

The Legislative Assembly decrees:

Chapter I

General Terms

Article 1:  This law is for organizing the public services covering national and international telecommunications in Panama.

Excluded from this law are radio and television broadcasting, amateur radio, and citizen's band, as well as paging systems, two-way radio, and cable [troncales] systems, which will be regulated by laws of their own.

Article 2:  Telecommunications are understood to be all transmission, emission, or reception of signs, signals, text, images, sounds, or information of any nature using wire, electricity, optical means, or other electromagnetic systems according to the definition of the International Telecommunications Union.

Article 3:  Public telecommunications services are those that make available to the general public any type or form of fixed or mobile telecommunications systems which make up the public telecommunications network.

Article 4:  The public telecommunications network is the collection of transmission mediums, distribution, and switching assigned to public telecommunications services.

This network is made up of international means of satellite transmission and reception, submarine cable, and part of the radio spectrum assigned to public telecommunication services, as covered by this law.

Article 5: The government guarantees public telecommunications services by not assigning frequencies of the radio spectrum or granting concessions or offering services that could interfere, impair, or jam the circuits in any way.

Article 6: Regarding definitions, valid are those established in treaties and international agreements which Panama is part of and in the rules of international organizations which are considered to be competent in connection with these treaties.

Chapter II

Public Telecommunications Services

Article 7: Public telecommunications services are hereby declared of social interest and public utility.

Article 8: The government will have the responsibility of directly offering public telecommunications services which exist now and those that could be offered in the future resulting from the combination of the ones existing now or some of their elements or systems, or those resulting from innovations or inventions from technological advances.

Article 9: Public telecommunications services will be structured and managed to ensure continuity of service. The government will encourage expansion ensuring free user access to the various services and by maintaining their social and public character.

Chapter III

Administering Public Telecommunications Services

Article 10: The government, through the National Institute of Telecommunications (INTEL), will provide all public telecommunications services, as established in this law and other applicable rules.

Article 11: INTEL assumes exclusively the right to plan, coordinate, rule, expand, operate, and administer public telecommunications services, subject to the assigned functions in Article 4 of Law No 80 of 1973.

Article 12: It is INTEL's job to inform and recommend to the executive branch on everything that affects or relates to the subject of telecommunications.

Article 13:  INTEL is the exclusive representative of the Republic of Panama before international telecommunications organizations and entities and the only one authorized to participate in negotiations and sign agreements on behalf of the country or as an operational entity with any entity operating an international telecommunications system.

As for international satellite systems existing on the day this law is promulgated, INTEL will immediately assume responsibility for representing the country as a party and will be the only state designee to sign operational agreements at the International Telecommunications Satellite Organization (INTELSAT) and the International Maritime Satellite Organization (INMARSAT).

Article 14:  Current concessions to exploit public telecommunications services will remain in force until the contract expiration date.  On that date, INTEL will exclusively assume the exploitation of these services.

Article 15:  In its capacity as signatory of INTELSAT, and while these concessions are in force, INTEL will authorize the interconnection of existing ground stations to offer public telecommunications services. The concessionary company will continue to fully assume all costs resulting from INTELSAT operations and any other related expenditures.

The concessionaire will supply circuits required by INTEL enabling it to offer public telecommunications services not competing with the concessionaire's public voice service at a negotiated rate to ensure adequate growth of circuits needed to develop international public telecommunications services supplied by INTEL.

Article 16:  Except for articles amended by this law, concessionaires of international public telecommunications services will continue to be regulated by measures contained in Cabinet Decree No 214 of 1970 and its amendments.

The finance minister will assume responsibility for aspects contained in Chapter Seven of that cabinet decree pertaining to economic regulations.

Article 17:  The government and justice minister will assume responsibility for the implementation of other measures contained in Cabinet Decree No 214 of 1970, except for the approval of rates, which will be the responsibility of the executive branch, with a prior INTEL recommendation.

Article 18:  Any surplus over revenues authorized by Cabinet Decree No 214 of 1970 will be used to broaden and change public telecommunications services in keeping with state development plans carried out by INTEL, to support programs implemented and managed by the General Directorate of Post Office and Telecommunications, and to be invested in social projects through the state general budget.

Article 19:  Upon the promulgation of this law, INTEL will be authorized to build, put into operation, and manage the ground stations it deems necessary to broaden and upgrade public telecommunications services.

Article 20:  When concessionary companies with currently valid concessions that have transmission means with international access use such means fully or partially to interconnect themselves to INTEL's telephone exchange structure, thus forcing all users of the telephone plant developed and operated by INTEL to use the international transmissions means of the concessionaire companies for outgoing and incoming telephone calls to and from any part of the world, such companies will negotiate the distribution of this service with INTEL to ensure that INTEL will not be placed in a disadvantageous position.

Article 21:  Any national and international access to intercommunications services will be effected exclusively through the systems established for this purpose by INTEL.  Parallel systems to those of INTEL cannot be established for national and international access.

Public telecommunications services enterprises with concessions that are in effect on the day that this law is promulgated are exempted from this stipulation.

Article 22:  The public telecommunications services assigned to INTEL, in conformity with the provisions of the present law, are those fixed or mobile, national or international services that can be rendered through the INTEL telecommunications infrastructure and which are available for the use of the public in general, as are:  telephone, telex, transmission of data, and all those  stemming from the application of Article 8 of the present law, as well as circuits leased for any of these purposes.

Article 23:  INTEL will establish the definitions, technical characteristics, extension, and rules of conduct of each public telecommunications service.

Article 24:  INTEL will determine the rules of conduct of the user terminals of any nature that are connected to the public telecommunications network, in conformity with prior authorization based on specifications and necessary confirmation to preserve their integrity and efficiency.

Article 25:  Without detriment to the provisions of the present law and with the purpose of protecting the space reserved for telecommunications, any system that exists or that is established in the country to offer radio braodcasting or television services, through any means of transmission, will be exclusively for this purpose and cannot be used to lend any telecommunications service that is in the competence of INTEL.

Chapter IV

Final Provisions

Article 26:  Upon conclusion of the concessions for public telecommuni-
cations services, INTEL will guarantee job openings under its labor system
for those workers of concessionaire firms that are interested in working
in that institution.  This will be after the concessionaire has paid them
off in full.  They must be guaranteed job stability and conditions similar
to those enjoyed by the INTEL workers.

Article 27:  The executive branch will issue the appropriate regulations
for the implementation of the present law.

Article 28:  Articles 5, 7, 8, 9, 10, 12, 14, 15, 45 numeral [figure
indistinct], 47, and 71 of Cabinet Decree No 214 of 1970; Articles 4, 5,
6, and 7 of Cabinet Decree No 59 of 1971; and Article 2 of Law No 79 of
1973 are rescinded.  Articles 11, 16, 17, 18, 19, 21, 34, 36, 37, 38,
40, 44, 45, 46, 51, 52, 53, 55, 56, 57, 59, 60, 62, 74, 65, 66, and 72
of Cabinet Decree No 214 of 1970, and Articles 2 and 3 of Law No 67 of
1973 are modified.

Article 29:  This law will become effective on the day of its promulgation.

To Be Communicated and Published

Given in Panama City on 26 June 1987.

H.1. Eng. Ovidio Diaz V.
President of the Legislative Assembly

Lic. Erasmo Pinilla C.
Secretary General

National Executive Branch--Presidency of the Republic.

Panama, Republic of Panama, 29 July 1987.

Eric Arturo Delvalle
President of the Republic

Rodolfo Chiari De Leon
Government and Justice Minister

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CSO:  55002050

## MOST ADVANCED MST RADAR BEING INSTALLED IN TIRUPATI

New Delhi PATRIOT in English 25 Jul 87 p 5

[Text]

Bombay, July 24 (UNI)—At a secluded spot called Mittagadanki, about 38 km from Tirupati in Andhra Pradesh, work is in progress on one of the most advanced facilities for atmospheric research in the country — the mesosphere, stratosphere and troposphere (MST) radar.

Expected to be completed in four and a half years the MST radar will be designed, developed, tested and installed by the society for applied microwave electronics engineering research (SAMEER), Bombay. SAMEER an autonomous body of the Department of Electronics (DOE) was set up in 1984 and is engaged in research in microwave communications systems, space and defence.

Project manager for SAMEER, P B Tole, told UNI that the radar was a national facility for atmospheric research and could make detailed and continuous study of atmospheric processes of up to 100 km. It is a high power pulse doppler radar operating in the VHF band, capable of providing estimates of atmospheric winds essential in the studies of dynamics, he said.

The cost of the SAMEER project, including installation and maintenance, is estimated at over Rs nine crore. Dr S P Kosta, director of SAMEER, said the project was being funded by the Defence Research and Development Organisation, the Department of Science and Technology, the Council of Scientific and Industrial Research, the Department of Environment and the Indian Space Research Organisation (ISRO) of the Department of Space which is the nodal agency.

The phased array radar will consume 2.5 mega watt of power. It will consist of 1,024 antennae placed in an area of 130 by 30 square metres. Its installation began in March this year.

At present Japan has the most advanced MST radar in the world. MST radars are also being built in Indonesia, Taiwan and the UK. Other countries where the radar is operational are peru, the US, Puerto Rico, Germany and Norway.

Dr B K Sarkar, scientist working on the project, said one of the major parameters provided by the radar would be on wind direction and velocity and this could be used to control pollution. Air turbulence studies would also help avoid accidents in the air, he added.

Gravity studies and other detailed scientific studies would also be available.

Mr Tole said the area covered by the radar was not important and it was the quality of data that was to be kept in mind. Compared with the data on windspeeds from balloons and other equipment being used currently the MST radar could provide information that was far superior.

At the moment, about 50 scientists are engaged in this project and on completion the facility will be open to scientists from all national laboratories, universities and scientific institutes involved in atmospheric research.

Dr Kosta said some of the major scientific experiments planned with the radar were in studying the three dimensional structure of gravity waves and turbulence, tropospheric wind profile prior to and during the onset of cyclones, troposphere and stratosphere interaction and detailed characterisaiton of equatorial waves and atmospheric tides in mesosphere and stratosphere.

According to Dr Kosta meteorology is oneof the applications of the proejct and weather studies would indirectly benefit from it.

/9274
CSO:   5550/0201

PAPER REPORTS ON PROBLEMS IN TELEPHONE SYSTEM

## Decisions on Technology

Bombay THE TIMES OF INDIA in English 9 Aug 87 p 8

[Article by Bharat Bhushan]

[Text]

NEW DELHI.

THE choice of technology for the second electronic switching system (ESS -II) factory at Bangalore has been surrounded in an unsavoury controversy. The controversy, which seems largely of the making of the department of telecommunications, has resulted in the unions at the Indian Telephone Industries (ITI) pressurising the government to save jobs, and in the possibility that indigenous technology for electronic switching, which is comparable, if not better than the imported technologies, may be marginalised. And this at a time when indigenous technology is just about ready for use.

This crisis is the result of faulty decisions taken about the phasing out of old electro-mechanical switching technology and the current indecision of the government about the speed with which the more modern electronic digital switching systems should be introduced.

If this situation continues, instead of producing its own telecom switching systems when it can easily do so, the country will be forced to resort to direct imports. And this is what a number of telecom multinationals are waiting for.

DIGITAL TECHNOLOGY

At the core of any telecom service is the switching system which makes it possible to transmit voice (as in the ordinary telephone) and other signals (e.g. data). Up to the early 1980s, the switching systems used in India were electro-mechanical—pentaconta crossbar and Strowger switches. In 1981, the government appointed a committee to suggest measures to improve the telecom services in the country.

The committee recommended that, in future digital electronic technology should be used for transmission and switching facilities. To this end, two factories producing electronic switching systems (ESS), with an annual capacity of 500,000 lines each were to be set up in the sixth plan period (1980-85).

However, only one such factory, at Mankapur in U.P., came up in this period. The technology used was the E-10B switch technology developed by CIT-Alcatel of France.

Simultaneously, the government also decided to develop the next generation of digital switching systems indigenously. As a result, in August 1984 C-Dot was set up with the mandate that with a budget of Rs. 36 crores, it would develop and test an indigenous digital switching system within 36 months. This technology was to be used for setting up future factories making electronic switching systems (large telephone exchanges).

And now that C-Dot has developed a fully indigenous state-of-the-art digital switching technology tailor-made to Indian needs, the scientists and technocrats responsible for doing so are afraid that it may not be utilised optimally.

How has this situation come about? It was in July 1983 that the government first approved ITI's plan to set up the ESS II factory at Bangalore because the pentaconta crossbar and Strowger switches being manufactured there were to be phased out. However, the project did not get implemented immediately because the department of telecommunications kept deferring its decision.

In June 1985, ITI submitted a fresh plan to set up the factory at Bangalore on the principle that ITI would limit itself to assembling the switch while buying the components from indigenous manufacturers. Although the technology was to be that of CIT-

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Alcatel, because of the "assembly only" principle, the investment required was to be half that of the ITI plant at Mankapur. This was approved by ITI's board of directors in July 1986.

Even before this, in January 1986, the department of telecom had signed a memorandum of understanding with CIT-Alcatel for purchasing equipment for the ESS-II factory. It also linked the project with the purchase of 200,000 lines of switching equipment as direct imports from the French company. Thus it had already made up its mind about using CIT-Alcatel technology for the ESS-II factory.

In the meanwhile, the telecom department cancelled the order for Pentaconta crossbar switches from ITI, Bangalore, and informed its management that crossbar equipment would not be required after March 1988. However, there was no indication of the department initiating any action to either ensure that the gap in demand would be met by setting up a new digital switching factory by March 1988, or that there were plans for the redeployment of the surplus workers.

In September 1986, the cabinet approved the setting up of ESS-II based on CIT-Alcatel technology and also gave clearance for importing 200,000 lines directly from France. Two months later, C-Dot asked the government to offer decision on the technology for ESS-II till its case for the use of indigenous technology for the new plant was ahead.

Thus, before, C-Dot staked its claim, the position of both ITI and the department of telecom was that CIT-Alcatel technology should be used immediately for ESS-II at Bangalore. This, it was argued, would help redeploy the 3,000 workers likely to be rendered surplus because of the closing down of crossbar production at Bangalore.

But after discussions with C-Dot, it

was decided that, of the total 500,000-line capacity of the ESS-II factory, 300,000 lines would be produced using CIT-Apcatel's technology, and the rest 200,000 lines would be based on C-Dot's technology. This proposal seems to have gone down well with the unions at ITI also.

However, now the department of telecommunication has changed its position and it wants only C-Dot's technology to be used for the ESS-II factory.

Such a position would seem ideal at the outset. After all, does it not favour Indian technology over that of the French? Indeed, it does. But, what if C-Dot does not deliver its technology for mass production in time? The department to telecom thinks that C-Dot can do so by the end of 1988 while C-Dot itself claims that it can do so by mid-1988.

There is no reason to doubt C-Dot's claims as so far it has kept to its time schedule. But there is every possibility of the department of telecommunications delaying the granting of the relevant clearances for implementing the project in time.

Were this to happen, and it is not a far fetched suggestion given the department's dithering over the setting up of ESS-II since 1983, the way would be open for further direct imports of telecom equipment. Indeed, it would be a curious scenario, where, in the name of self-reliance in, telecom equipment production, direct imports would be resorted to. Some critics of the department of telecommunications claim that the possibility of imports indeed is the reason why it was suddenly tilted in favour of C-Dot's technology. Such claims are difficult to verify.

However, the fact remains that the

department has, no doubt, contributed to creating a surplus labour situation by deciding the phase out crossbar and strowger switching systems by 1988 and 1999 respectively. And it is these 11,700 surplus workers whose fate is now being used to press for making a quick choice of technology. There is in fact no such hurry.

The department of telecommunications should have formulated its crossbar and strowger phasing out plans knowing full well that digital switching factories even if their setting up coincided with the phasing out of the electro-mechanical switches, cannot redeploy all these workers immediately. Even the ESS-II factory at Bangalore cannot use 3,000 workers.

Why then the haste to phase out the electro-mechanical switches when they are still used even in the developed countries? Why cannot Strowger and crossbar switches continue to be used for smaller exchanges outside the metropolitan cities?

It is not too late even now to match the phasing out of old technology with the introduction of new technology. Only if this is done can the job losses in ITI be redued and wherever possible retraining programmes designed to redeploy the surplus workers. And equally important, this is also the only way in which a better technology, which is fully indigenous and which can be improved upon within the country, can be given the leading role if deserves in the future telecom expansion plans of the nation.

## Report on Future

Bombay THE TIMES OF INDIA in English 10 Aug 87 p 7

[Text]

NEW DELHI, August 9 (PTI). TELEPHONE services would continue to be inadequate by the end of the century, in spite of laudable efforts made recently by the government to update the communications sector, according to a study conducted by the Federation of Indian Chambers of Commerce and Industry (FICCI).

The study on "Future of telecommunications" says official targets are to have 19 million telephone connections on demand by 2000 A.D.

There will also be six lakh public telephones in rural areas, or one in every village and ten lakh public telephones in urban areas.

Similarly, for business and industry, special facilities, combining voice and non-voice communications of ISDN type, were planned as an overlay network. The demand for such connections is estimated to be eight lakh by the end of the century.

The FICCI report quotes telecom experts as saying that these targets, laudable as they are, will still fall short of requirements."

The study, quoting experts, says the target for telephones should be substantially higher at 30 or more million lines. "The current target for 19 million will raise telephone density to two per 100, which will leave India way behind other countries".

The report suggests that the rural targets for PCOs should be doubled to at least three million. The study further says agriculture has tremendous potential for commercial exploration and therefore should become a major earner of foreign exchange. "An up-to-date rural telecom system linked to international information network is basic to our agricultural activities," it says.

The study says "the proposed business network has a narrow coverage of urban corporate office."

It says business needs sophisticated connections between factories in remote areas and the corporate offices. Therefore, new enhanced voice and data services must be made available nationwide. "Direct dialling to all major cities and other countries from rural areas is also an essential requirement", according to the study. It says with 730 million population, India has only three million telephones, which works out to be a telephone density of 0.4 per 100, against the 500 million telephones in the world for a population of five million or a density of ten telephones per 100 persons.

The FICCI report further says accessibility for telephones within the present capacity is lopsided. "Whereas, 25 per cent of the population or 180 million in urban areas have access to 90 per cent of the total telephones or 2.7 million telephones, rural areas accounting for 75 per cent of the population, or 550 million, have only ten per cent of the phones or 0.3 million."

The report says the telecommunication network in India is beset with problems such as high initial cost, long waiting list of one million, mostly in urban areas, and poor quality of service. "This situation is largely due to wrong technological choices and low priority accorded to telecommunications under the different plans."

The seventh plan prescribes a five-pronged telecommunications strategy —balanced growth, rapid modernisation, quantum jump in technology, increase in productivity, and innovations in organisation and management.

It aims at eventually providing an integrated services digital network in (ISDN), improving or replacing worn-out equipment, making significant progress in new technology areas like digital electronics and fibre optics, commencing new services for business and industrial sectors, extending telecommunication to rural areas and developing non-voice telecom services, including data communication and computer communication systems.

SPECIAL TELECOMMUNICATIONS NETWORK PLANNED FOR INDUSTRY

Calcutta THE TELEGRAPH in English 9 Jul 87 p 7

[Text] Calcutta, July 8: The Union government might consider installing a special telecommunications network for industry, provided the latter can help in raising the necessary resources.

The proposed network would bypass the existing system and provide a much more reliable service, a spokesman of the Confederation of Engineering Industry said here today while pointing out that the absence of an efficient telecommunications system was one of the major problems which plagued industry at present.

At a recent meeting with the secretary in the department of telecommunications, Mr D.K. Sangal, the CEI president, Mr Suresh Krishna, gave the confederation's undertaking to help raise the required finance.

In addition, the concept of the cellular telephone system was discussed and, here again, CEI agreed that it would get industry's commitment to mobilise resources for provision of such a service by the DoT.

Under the special network, it was proposed that separate, new telephone exchanges would be installed apart from the existing exchanges, to which industry subscribers would be connected for a fee of Rs 25,000 per line, the spokesman said. These subscribers would then have access to reliable channels of communication, instead of having to contend with the present vagaries.

To make this project viable, at least 5,000 lines would have to be provided for, he said. CEI would be conducting an exercise to quickly identify companies which would be willing to participate in such a project. The list of potential users with the total number of connections required would be forwarded to DoT by CEI within the next three months. It was envisaged that the entire project would take about 18 months to commission, he added.

For the cellular telephone facility, an investment of Rs 50,000 per line would have to be made by industry with DoT. In addition, the cellular telephone instruments, costing Rs 30,000 each, would have to be procured by the subscribers. This project would also take about 18 months to fructify, the spokesman added.

He expressed confidence that there would be considerable demand for these specialised services to subscribers willing to invest an additional amount for a service which was so acutely needed to promote business, particularly exports.

He mentioned that in its efforts to improve telephone services here, Calcutta Telephone had embarked upon a scheme called "Project Calcutta Telephones," covering the period between April 1987 and March 1989 in two phases and spelling out the resource requirements.

The project envisaged installation of 1,17,500 exchange lines and media to provide for 50,000 junctions, construction of 60 km of cable ducts, replacement of 1,100 km of underground cables and one lakh telephone instruments and erection of 500 cabinets/pillars and 20,000 DPs. The overall requirement of funds on this account had been estimated at Rs 246.9 crores.

/13104
CSO: 5550/189

TELECOMMUNICATIONS PLANS DISCUSSED AT MINISTRY MEETING

Calcutta THE TELEGRAPH in English 12 Jul 87 p 5

[Text] New Delhi, July 11: The department of telecommunications has formulated a new annual action plan for 1987-88 under which three lakh lines of telephone switching capacity will be opened. The commissioning of nine digital trunk automatic exchanges, adding 20,000 lines in the long distance switching network, provision for 1,200 long distance public telephones in rural areas and the setting up of 32 new telex exchanges are also part of the new plan. Thirty-two satellite stations will also be commissioned in different parts of the country.

This was stated by the communications minister, Mr Arjun Singh, at the meeting of the consultative committee of members of Parliament of his ministry here. The minister of state for communications, Mr Santosh Mohan Dev was also present at the meeting.

Mr Arjun Singh said the department had finalised another action plan under the 20-point programme to make the administration "more responsive." Both plans will be closely monitored and corrective action taken wherever necessary to ensure that the targets are achieved," he said.

The minister informed the committee of the achievements made by the department during the first quarter of the current year. He said about 38,000 telephone lines had been added to the local network. The International Subscriber Dialling (ISD) facility is likely to be extended to 143 countries, he said. Recently, Switzerland was put on the ISD map of India.

The minister said the "Mission—Better Communication" programme launched by the department last year had "gained momentum and results have started pouring in." Lauding the communications staff, Mr Singh said "positive changes" in the attitudes of staff towards customer needs had been recorded.

The minister also informed the committee that the Post and Telegraph department had obtained the approval of the ministry of finance for opening 222 new rural post offices including 64 in tribal areas. These post offices will be opened in Bihar, Kerala, Maharashtra, Madhya Pradesh, Punjab and Rajasthan.

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CSO: 5550/191

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## SATELLITE TO BE USED IN MAJOR COMMUNICATIONS SYSTEM

Bombay THE TIMES OF INDIA in English 12 Jul 87 p 7

[Text] THE Oil and Natural Gas Commission (ONGC) is establishing a major corporation communication systems using the INSAT 1B satellite, according to highly placed ONGC sources.

Acronymed 'telnet', the Rs. 16 crore communication network would not only provide long distance voice communications but also inter-connect computers at corporate headquarters with regional headquarters and provide low speed data transmission.

The ONGC has acquired 12 dedicated channels of INSAT 1B for the purpose.

Bombay is likely to become the headquarters for the communication system, the sources told PTI.

The network will also establish speech circuits from important work-sites to regional head quarters. The telesupervisory data transmission requirements of production units between Bombay, Baroda and Nazira would also be met once the system becomes operational.

The ONGC has also proposed to establish four earth stations at Dehradun (its HQ), Baroda, Nazira and Jammu to augment the already existing dot earth stations at Madras and Calcutta.

The new satellite-based communication systems will help enormously in taking quick decisions and cope up with emergencies by speaking directly to the workers on sites, whether it be a rig on land or offshore, the sources said.

At present also, satellite earth stations at Uran, Hazira and BHN complex help in establishing a pipeline integrity between oil and gas producing centres in Bombay High with the respective processing centres.

The existing supervisory control and data aquisition system (SCADA) utilised by ONGC integrates the departments of telemetry, communication and computers.

The SCADA systems consist of a number of remote telemetry units located at various unmanned platforms. These units pick up vital information pertaining to well head pressure, temperature and flow of various parameters from remote platforms and through radios transmit data to a centarl computer.

A colour graphic display also gives the required field information at a glance.

ONGC sources said networking of these computers will bring the company on line with the new generation of satellite stations using digital SCPC (Single Channel Per Carrier) technique. The two stations at Uran and BHN offer 24 channels of data and voice transmissions.

Popularly known as "talking computers", these machines will also exchange and process information between themselves in addition to providing facilities like electronic mail, file and message transfers.

For digitised voice transmission too, the same satellite and radio channels are put to use, the sources said.

ONGC's future plan includes implementing local area networking and teleconferencing thus providing a big lead in intensive utilisation of digital satellite channels.

/13104
CSO: 5550/190

BRIEFS

DIALING TO NEPAL--India and Nepal will have direct dialling telephone system
from Wednesday 10 a.m.  Nepal is the second member-country of the South Asian
Association of Regional Cooperation with which India is to have ISO system.
The other country is Bangladesh.  With this Indian subscribers in around 400
cities will be able to dial directly to Kathmandhu, Birganj, Janakpur, Biral,
Pokhara, Bhaiahawa and Nepalganj.  In order to strengthen the economic
relations between the SAARC member-countries, special tariff has been fixed.
In the case of Nepal, charges will be levied on the basis of one local call
for every two seconds day and night.  [Text]  [New Delhi PATRIOT in English 15
Jul 87 p 5]  /13104

ELECTRONIC TELEPHONE PLANT--A group of non-resident Indians from Qatar have
set up a plant in India to manufacture 200,000 units a year of electronic
telephone equipment in technical collaboration with West Germany's Siemens
firm.  The project, estimated to cost around Rs 30 million, will have the
participation of more than 30 NRI's, 28 of them from Doha.  Most of them are
technocrats who pooled Rs 6 million towards the project cost.  Reports from
Doha said that the instruments produced in this plant would be of push button
type and will be capable of withstanding voltage fluctuations.  About 27 per
cent of the components will be produced in India.  The Nasik-based factory,
employing about 175 people, including 25 professionals, is to become
operational by mid-July this year, the reports said.  The Qatar NRI's are also
setting up their second project in India with a Japanese collaborator for the
manufacture of a facsimile machine plant.  According to these reports,
negotiations are underway for the project which is expected to cost about Rs
30 million.  While the Indian Government has so far given nine licences to
manufacture 2,000 facsimile units by each party, the Qatar NRI's project will
become the largest of its kind in India with the licensed production capacity
of 5,000 units.  [Excerpt]  [New Delhi PATRIOT in English 14 Jul 87 p 9]
/13104

SERVICE TO SWITZERLAND--The International Subscriber Dialling service (ISD)
between India and Switzerland was inaugurated today with Minister of State for
Communications Santosh Mohan Dev, making a call to the Swiss Councillor for
Transport and Communication Lwon Schlumpf, in Geneva.  Mr Dev suggested that
the Videsh Sanchar Nigam Limited (VSN) should set up an international gateway
centre in the eastern region and evolve schemes to bypass the congested
national links to deliver service at user premises.  Indian's ambassador to

Switzerland Ashok Sen Chip also spoke to Mr Dev and Swiss consul general in
Bombay Bernard A Sandoz.  Managing director of VSN T H Chowdary said
Switzerland was the 24th country to be linked by ISD service.  He was
confident that by March next year 76 countries would be linked with a similar
service.  He said as part of the Rs 200 crore modernisation and expansion
plan, a coastal earth station would be set up in Pune by 1989 which would
enable subscribers to contact passengers travelling in ships and those
travelling by Indian Airlines and Air-India planes to contact their respective
destinations on telephone. [Excerpt]  [New Delhi PATRIOT in English 8 Jul 87
p 2]  /13104

INDO-PAKISTAN STD AGREEMENT--India and Pakistan reached an agreement on Monday
under which 340 telephone exchanges in India and 140 in Pakistan would be
connected to provide subscriber direct dialling facility by the end of
September or early October this year.  All technical hurdles have been cleared
and both the sides are keen on implementing the arrangement without delay.
The leader of the Indian delegation, Mr G. Kulkarni, told newsmen "Inshe
Allah" and the Pakistani delegation promptly agreed at a diplomatic reception
last night.  An important aspect of the agreement is the settlement of the
longstanding accounts of the telecommunication service between the two
countries from 1947 to 1981.  It involves a financial settlement of about half
a million rupees and has been satisfactorily resolved, it is stated.  Like the
Khokrapar rail link resumption, the proposal for subscriber direct dialling
facilities has long been under the consideration of the two countries and
their fortunes have fluctuated with the undulating Indo-Pakistani relations.
[Text]  [Bombay THE TIMES OF INDIA in English 16 Jul 87 p 16]  /13104

DIALING TO PAKISTAN--The third Indo-Pak telecommunication talks concluded here
yesterday after deciding that the long promised direct dialling facility
between the two countries will be introduced in September, reports PTI.
Initially, 24 channels are to be made available.  The VFT circuits between the
two countries will be increased from 18 to 24.  The two sides also agreed to
examine the question of lowering tariff to encourage telecommunication
traffic, according to an official Press release.  Improvement in the quality
of present telecommunication links and the maintenance of the system was also
discussed during the three-day meeting.  [Text]  [Calcutta THE STATESMAN in
English 15 Jul 87 p 12]  /13104


CSO:  5550/0192

SHIRAZ TELEPHONE CENTER BECOMES OPERATIONAL

Tehran KEYHAN in Persian 27 Jun 87 P 3

[Text]  Shiraz--KEYHAN correspondent:  Yesterday afternoon, at a ceremony in the
presence of the minister of post, telegraph and telephone the 10,000-unit tele-
phone center of Vali-e Asr [may God speed his coming] in Shiraz became operational.

This telephone center which was built at a cost of seven billion rials on a 6000-
square meters of land will be capable to expand to 30,000-unit in the future.

At the inauguration ceremonies of this center where a number of the dignitaries
of that province were present, first the director general of Fars Communications
Department presented a report on the operation of the communication system in
that province.  Thereafter, Engineer Gharazi, minister of post, telegraph and
telephone while pointing to the role of communications in rendering various ser-
vices and reducing costs for the general public, said:  As a result of extensive
need of the general public to the system of communications, the companies which
provided such services during 1986 made a profit of 250 billion dollars which was
more than all the revenues of the OPEC oil-producing nations.

While pointing to the country's 110 billion rials annual income from the post
and communication-related services, he stated:  If we were able to provide new
technology and better possibilities for our country's communications industry,
this income could be increased to 500 billion rials a year.

At the end of these ceremonies those who were present made a visit to the tele-
phone center of Vali-e Asr in Shiraz.

This morning Engineer Gharazi, minister of post, telegraph and telephone took
part in a press interview and answered the questions posed by the mass media.
He said:  the bill for turning the postal service into a private concern has
been ratified by the Islamic Consultative Assembly and in the near future after
preparation of the articles of association this government institution will go
public.

Engineer Gharazi further added:  During last year 152,000 new telephones were
assigned to the applicants and in the course of the current year another 220,000
telephones will be duly assigned.  He also said:  We need six million more new
telephones, which will be assigned during the next 10 years at a rate of 500,000
annually.

While pointing to the 4-fold increase, during the current year, of the intercity telephone cables, the minister of post, telegraph and telephone stated: Every city which has 5,000 or more inhabitants, at the end of 1366 [21 March 1987 - 20 March 1988] and the beginning of 1367 [21 March 1988 - 20 March 1989] will be put under the cover of our communication plans.

With regard to the self-sufficiency of the communications company, the minister of post, telegraph and telephone said: Last year this company had close to 100 billion rials revenue of which about 45 billion rials went to pay the personnel and defray other administrative costs and the remainder was invested for the execution of expansion plans of this network.

He further stated: The total cost of each telephone for the government is between 500,000 to 700,000 rials, while the applicants are charged only 150,000 rials, thus the remainder has to be paid by the government in the form of subsidy.

In conclusion, with regard to producing 25,000 to 50,000 square meters of pre-printed labelled paper for communication plants, he said: Importing this type of supplies has been very costly for us. God willing, in our long-term program, in addition to attaining self-sufficiency and printing of our own labelled paper, by the year 1381 [21 March 2002 - 20 March 2003] the total telephone numbers of the country will be increased by another 12 million, where the villages and other remote areas will be given priority.


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CSO: 55004727

MOBILE PHONE EQUIPMENT ORDERED FROM FINLAND'S NOKIA-MOBIRA

Helsinki HELSINGIN SANOMAT in Finnish 12 Aug 87 p 31

[Unattributed Article:  "Mobira Exporting Equipment Worth Forty Million
Markkas to Kuwait"]

[Text]  (Turku)  (Special to HELSINGIN SANOMAT).  The firm of Nokia-Mobira has
made a forty million markka sale of mobile phone equipment of Kuwait, as the
company's opening to the Near East market.  Nokia-Mobira and the Kuwaiti
Mobile Telephone Systems have entered into agreement for a forty-million
markka sale automated and manual phone equipment, which will be set up next
year.

The telephone equipment will be shipped from Salo to Kuwait during the first
part of next year.  This contract is Mobira's first mobile-phone penetration
into the Near East.  The contract includes both the phone equipment and
technical training for personnel.

The Kuwaiti mobile phone system is the English-made TACS, and the phone
network was put into operation a year ago.  The system now has around 1,300
subscribers.

/12913
CSO:  5500/2542

## SUPARCO STUDIES LAUNCHING OF SATELLITE

Karachi BUSINESS RECORDER in English 10 Aug 87 p 1

[Text]    Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) has initiated a programme of fabrication of a low-cost experimental satellite for launching into a low earth orbit.

The spacecraft will be used mainly to acquire first-hand experience in tracking, monitoring and house-keeping functions.

Meanwhile, a pilot project to examine the utility of satellite remote sensing for the study of siltation and related processes in the Tarbela and Mangla reservoirs has shown that the landsat MASS data can be used to identify suspended sediments and to differentiate between various turbidity levels, which indicate areas of sedimentation.

The study has been extended to include investigation of topographic and geomorphological changes in the Tarbela and Mangla reservoirs as a result of the processes of deposition and or erosion.

In the case of Mangla, it was seen that the temporal shifts were generally inward, indicating that the process of deposition was causing topographic changes. In the case of Tarbela, no particular trend has been established. These results are provisional and further study is continuing.

According to another report ozone concentration measurements at Karachi since January 1984 have shown the ozone levels to be comparable with those found in Kagoshima (Japan) and Louisiana (USA), indicating a minimum in summer and maximum in spring and late autumn. The contribution of air pollution does not appear to be significant in the observed surface ozone concentration. Maximum ozone concentration occurred in the months of February March, October and November.— PPI

/13104
CSO: 5500/4726

BRIEFS

AEROSPACE INSTITUTE PLANNED--Pakistan's first Aerospace Institute, being
established by Pakistan Space and Upper Atmosphere Research Commission in
Karachi to conduct post-graduate courses in various disciplines of space
science and technology, is expected to start functioning in June 1988.  The
Institute, which would cater to the expanding needs of trained manpower of the
commission, will conduct courses in aerodynamics, mechanics, heat transfer,
propulsion, quality assurance and testing, tracking, telemetry and digital
communications computers, simulators, fibre optics, lasers, control systems,
remote sensing and sensor technology, satellite communications, launch
vehicles, satellite structure, etc.  The training program will lead to award
of Master's Degree to the participants on successful completion of a post
graduate course of study spread over two years.  [Text]  [Karachi DAWN in
English 4 Aug 87 p 8]  /13104

CSO:  5500/4726

KING FAHD OPENS TELECOMMUNICATIONS CITY IN JEDDAH

Riyadh ARAB NEWS in English 22 Jul 87 p 1

[Article by Khaled Nazer]

[Text]

JEDDAH, July 21 — The Custodian of the Two Holy Mosques King Fahd opened here tonight the King Fahd Satellite Telecommunications City here and reiterated that the government would continue to provide allout support for the promotion of telecommunications and all other sectors within its efforts to attain consummate progress.

The king lauded the establishment of the city, which has enabled the Kingdom to become the fifth country in the world in the realm of telecommunications, and said it was part of the overall development the country has achieved in all fields.

King Fahd noted that the city will help link all parts of the Kingdom with each other and with the rest of the world and described it as a modern technological achievement.

He recalled the efforts he had exerted when he was education minister, alongwith notable educationists, to promote education in the Kingdom and said the country is now reaping the harvest of these efforts in the form of spectacular development in both the civil and military fields.

King Fahd was received upon arrival at the site by Makkah Governor Prince Majed, PTT Minister Dr. Alawi Darweesh Kayal and other officials.

The ceremony was attended by Prince Abdullah Al-Faisal, Prince Sultan, second deputy premier and defense and aviation minister, Riyadh Governor Prince Salman, princes, ulema, ministers and senior civil and military officials.

Addressing the function, Dr. Kayal lauded King Fahd's efforts to promote telecommunications and said the city would further link the Kingdom with the rest of the world.

He said the Kingdom now has 1.3 million telephone lines, 20,000 car telephones and 30,000 telex lines. The posts handle 700 million items every year, he added.

Dr. Kayal said with the opening of the city which provides additional 3,000 telephone circuits, the Kingdom now has 6,000 telephone circuits which will enable 6,000 subscribers to communicate with the rest of the world simultaneously.

After the opening ceremony King Fahd and his entourage toured the various sections of the city and were briefed about its various functions.

Talking to *Arab News,* Secretary-General of the International Telecommunications Union Richard Bulter described the city as "one of the most update communications centers in the world" and said with the completion of this city, the Kingdom will be providing worldwide communication coverage.

He said Saudi Arabia, one of the oldest members, of the ITU established in 1865, is one of the leading financial contributors to the advancement of telecommunications in the world.

The city embraces four ground stations to deal with different satellites. The first one deals with the International Satellite pertaining to "Intelsat" rotating over the Atlantic Ocean to transmit the movement in exchange between the Kingdom and the countries located on the Western Hemisphere. The second deals with the international satellite belonging to the same organization and rising over the Indian Ocean to transmit the traffic in exchange with the

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# Fahd

countries situated on the Eastern Hemisphere. The total capacity of the two stations amounts to 2,700 telephone circuits, in addition to TV transmission channels.

The third one is "Arabsat" dealing with the Arab Satellite i.e. to serve communications between the Kingdom and the Arab world. Its total capacity is 852 circuits, beside TV transmission channels. The fourth and last station is meant to deal with the satellite belonging to the International Maritime Space Communications (Anmarsat) serving the mobile erections, on land and sea to serve the ships maritime devices, aircraft and ground vehicles, in addition to serving feeding and rescue operations. Its total capacity in 36 circuits.

/9274
CSO: 5500/4515

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DIRECT DIAL LINKS INDIA, COLOMBO

BK241205 Colombo LANKA PUWATH in English 1100 GMT 24 Aug 87

["OANA Pool" item]

[Text]  Colombo, 24 Aug (LANKA PUWATH)--A news agency report from New Delhi
monitored by LANKA PUWATH states that Prime Minister Rajiv Gandhi spoke to
Sri Lankan President Junius Jayewardene today in the first direct dial tele-
phone call from India to the Indian Ocean island, officials said.

Mr Gandhi dialled Mr Jayewardene's Colombo number from New Delhi, but of-
ficials did not reveal what the leaders spoke about.

Residents of 400 Indian cities should be able to dial directly to eight
cities in Sri Lanka, the third country in South Asia after Bangladesh and
Nepal to be linked by direct dial with India.

India now has direct dial links with 57 countries.

/9274
CSO:  5500/4727

RIGA RADIO-TELEVISION TOWER FAR BEHIND SCHEDULE

Moscow IZVESTIYA in Russian 23 May 87 p 3

[Response by Ye. Vostrukhov, IZVESTIYA correspondent in Latvia, to a letter to the editors: "A Tower That is Still Not Finished"]

[Text]  In one issue of your newspaper for 1984, I read that a new TV tower would be built in Riga by the end of 1985. It is now 1987 ... One can concede that that was before the restructuring, but the feeling that I and all of Riga's residents are being deceived will not go away.  (A. Bulatov--Riga)

Ye. Vostrukhov's response:

Obviously, A. Bulatov has in mind the report "Tower Over the Island."  Why over an island? The tallest structure in the Baltic republics is being built on one of the Daugava River islands. But, alas, out reader is right: the transmitting complex could not be put into operation by December 1985. The reasons for this were the traditional ones: the sluggishness of the builders, lack of interest in a second-priority site (in the recent past, there was no strong demand for new construction of facilities for cultural purposes), and uncoordinated actions by the interested parties.

The delay in the tower construction is caused also by its uniqueness. This design for an all-welded metal radio-television tower was being constructed for the first time.  Changes had to be made in the design and work organization, since many of these tasks had never been performed before. In many cases, the assembly works were experimental.  X-ray, laser, and ultrasound testing were used for checking the structure.

But the tower was only slightly late in completion: the startup complex was constructed in June 1986. Thus, the giant tower has been transmitting TV programs for a long time now, including those received by your TV, Comrade Bulatov. This year, all construction projects are scheduled for completion. However, a delay can still occur: the transmitters have not arrived yet in Riga. The USSR Ministry of Communications ordered them on time, but the manufacturing plant has not even started to execute the order. Specialists from the Ministry of Communications have asked the Ministry of Foreign Trade to buy the equipment abroad, but as of today, they have not been promised anything.

13355
CSO:  5500/1046

EEC PUBLISHES RACE DRAFT WORKPLAN

Brussels  DRAFT RACE WORKPLAN in English No OTR100 15 Jun 87  pp  I-X,  Vol I:
i-ii, Vol II: i-ii

[Introduction  and  Tables of Contents to Volumes I and II of the  DRAFT  RACE
WORKPLAN  prepared  by  the Commission of the European Communities  and  which
"forms part of the documentation provided for the preparation of proposals for
RACE  projects."   The  Workplan includes an Introduction (10 pages)  and  two
volumes:  Volume  I is  a Workplan Description (63 pages)  and Volume II is  a
Tasks Specification (128 pages).]

[Text]                                INTRODUCTION

## 1.    *GENERAL*

*The object of the RACE Programme is to pave the way towards commercial use of
Integrated Broadband Communications (IBC) in Europe by 1995.*

*This objective entails significant Community work of pre-competitive and pre-
normative nature in order to facilitate a coherent approach by the main actors
(Operators, Telematics Industry and Service Providers), towards cost effective
evolutionary strategies and implementation of advanced systems and applications.*

*RACE is therefore aiming at a wide range of actions organised into a structured
Workplan, the details of which are presented in this document.  This Workplan has
been established on the basis of:*

*a)      The results of the RACE Definition Phase (July 1985 to December 1986).*

*b)      The complementary indications and analysis provided by a large number of
experts from the National Administrations, Telecommunications Operators
Organisation, Telematics Industry, Service Providers and Academics.*

## 2. *BACKGROUND TO THE RACE WORKPLAN*

**2.1** *During the second half of 1984, representatives of the Telecommunications Operators Research Centers and of the Telematics Industry jointly drafted the first EC wide IBC action plan (RACE). This plan was based on the following major points:*

  *a)*      *The target date for EC-wide commercial introduction of IBC in Europe is 1995.*

  *b)*      *The introduction of IBC is to build on the evolution of ISDN.*

  *c)*      *Standardization of the IBC is to be in step with CCITT plenary meetings in 1988 and 1992.*

  *d)*      *IBC introduction requires the coordinated development of applications, networks and enabling technologies.*

**2.2** *To prepare for the execution of the RACE Main Phase, a RACE Definition Phase (RDP) was decided in July 1985 and executed from January 1, 1986 to December 31, 1986. The objective of the RDP was to:*

  *a)*      *Lay out initial European IBC Reference Models covering the three aspects of Applications, Terminals and Networks.*

  *b)*      *Conduct the necessary techno-economic assessments to support work on the Reference Model.*

  *c)*      *Provide a firm basis for the establishment of the RACE Main Workplan.*

**2.3** *To follow-up the RDP, in October the CEC submitted a Proposal for a Council Regulation on RACE (Com(86)547). The Workplan associated with the proposal consists of three parts:*

  *I*      *IBC Development and Implementation Strategies*
  *II*      *IBC Technologies*
  *III*      *Pre-Normative Functional Integration*

*The tentative content of each part was established in September 1986 on the basis of the information available at that point in time (that is before the RDP work had been evaluated in full detail).*

### 2.4   The impact of RDP on the RACE Workplan

### 2.4.1   Programme Organization

The detailed evaluation of the RACE Definition Phase generated major recommendations for further actions. As a result a new version of the RACE Main Workplan has been established which retains the initial structure and major objectives but embodies the following improvements:

a)   A structure of the overall workstatement indicating clearly the hierarchy of tasks, thereby offering improved possibilities for management.

b)   The establishment of an IBC Reference Model and Implementation strategy work as the leading edge of RACE.

c)   Functional relationships between Part I (IBC Development and Implementation Strategies), Part II (IBC Technologies) and Part III (Pre-normative Functional Integration).

### 2.4.2   Contents of Parts I, II and III of the RACE Workplan

a)   Activities oriented (in order to meet the needs of RACE actors and IBC users) towards the building of a consensus on strategies, functional specifications and implementation planning.

b)   Pre-competitive R&D work oriented towards enabling IBC techniques and exploration of markets for IBC applications and services.

c)   Pre-normative work through which results of the RACE programme may be channeled to standardization bodies.

Clearly the structure of the Workplan should reflect the varied nature of the actions and, in addition, offer appropriate management possibilities. Figure 1 shows the operational links between the various sections of the Workplan.
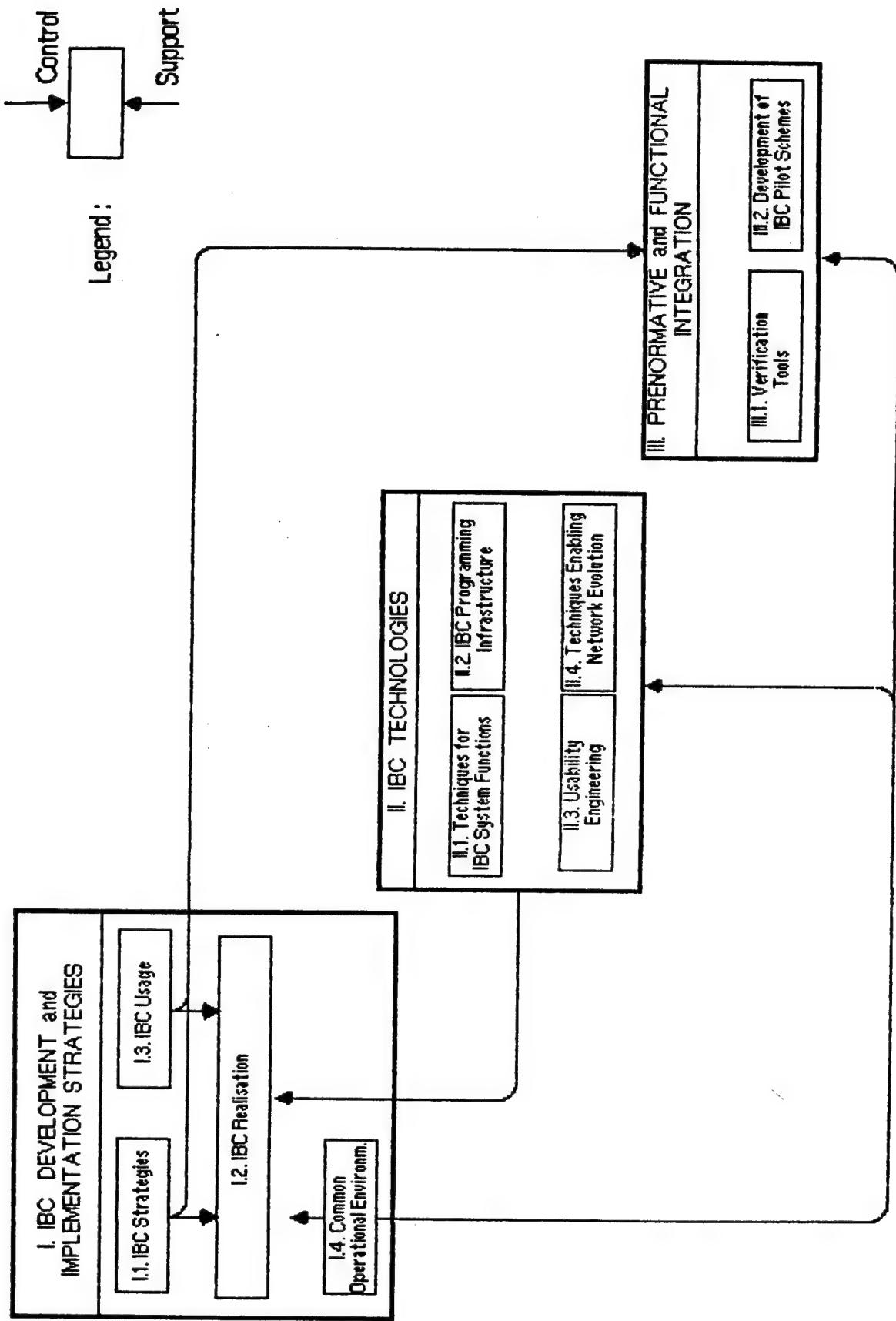
Fig 1. RACE MAIN WORKPLAN

# 3. *STRATEGY AND REALISATION*

## 3.1. *Overview (see Fig.2)*

**3.1.1.** *The work on IBC Strategy has the task of developing a consistent comprehensive strategy for the introduction of IBC in Europe. The work includes:*

*IBC Usage, relating to user needs and requirements;*

*IBC Realisation, relating to the practicalities of implementing proposed strategies.*

**3.1.2.** *The work on IBC Realisation supported by the work on IBC Technology, addresses constraints and opportunities related to technology advances.*

**3.1.3.** *The IBC Strategy activities are divided into two main streams:*

*- the Functional Reference Model is intended to cater for the enduring, stable 'system' functions and is to be developed 'top-down';*

*- the Reference Configurations which are intended to encapsulate the changing 'network-related' implementations of the above functions and will be generated in a 'bottom-up' manner.*

**3.1.4.** *These two streams 'come together' in the 'Evolution Planning' activities, which bring together all aspects, functional and implementation, stable and transient, of the IBC system and network.*

**3.1.5.** *Throughout the RACE workplan, the Customer Premises Network is regarded as part of the IBCN. It is recognised, however, that the Consumer Products Industry which supplies this market is different in many ways from the Telecommunications Industry and hence the CPN is handled in the workplan by distinct tasks.*

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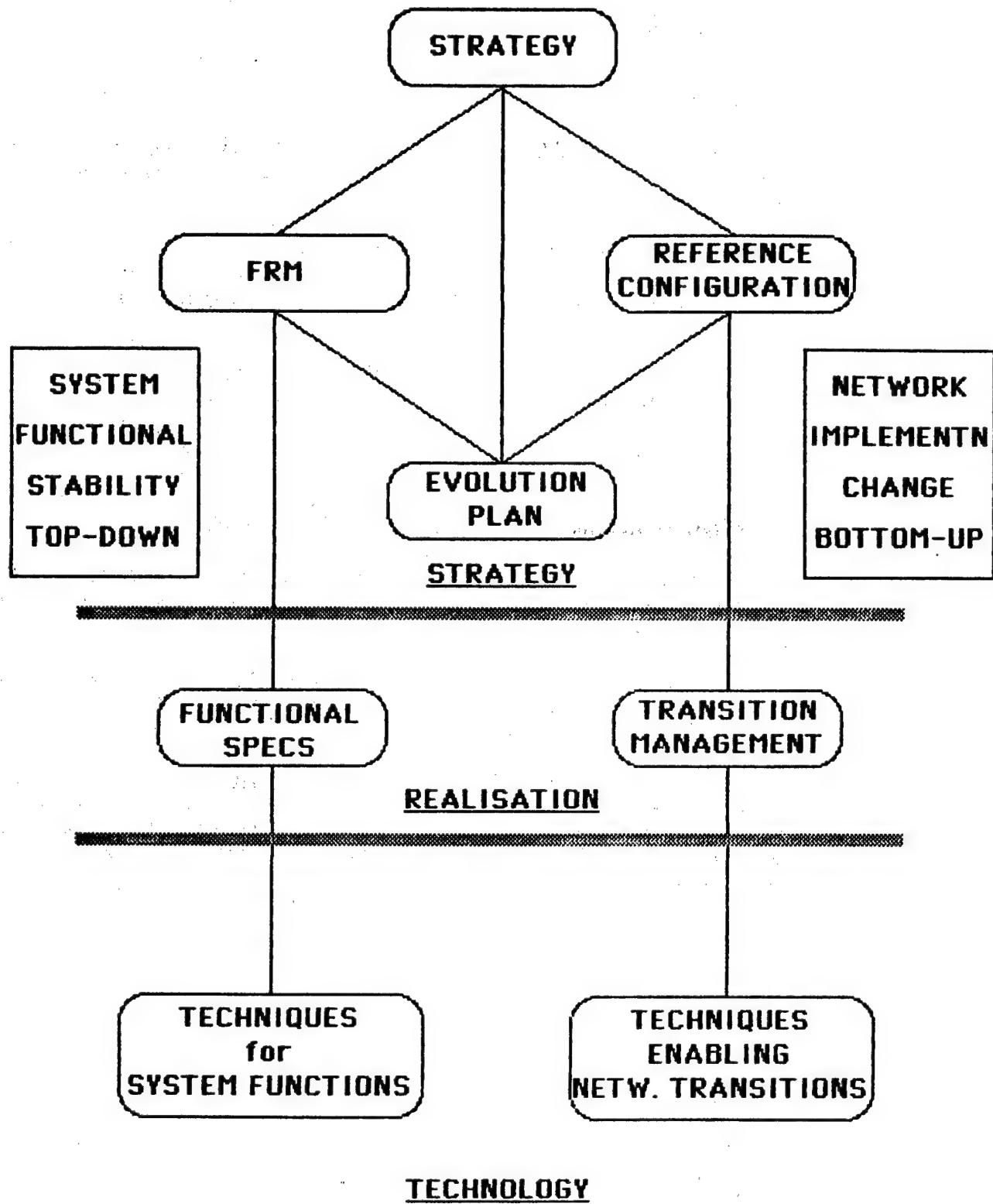
Fig 2. Rationale of RACE Workplan

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## 3.2   Models

*The workplan is, to a large extent, based on two conceptual models, which provide complementary views of IBC. Many tasks in the workplan are concerned with refinements of these models.*

*The work on modelling which is part of "IBC Strategies" is indicated in Figure 3, where the relationship between Functional Reference Model, Reference Configurations, and Evolution Planning is depicted. (For terminology definitions please refer to Workplan Volume I, page 1.*

## 3.3   Functional Aspects

*Fig.4 shows the refinements of the Functional Reference Model and its place in the workplan . Based on the FRM, functional specifications are developed.*

*Based on these functional specifications, techniques which are needed to actually implement these functions are addressed in Part II of the workplan.*

*Functional Specifications are a corner-stone of the RACE workplan.   IBC functions are broken down hierarchically until generic functions can be identified.  Generic functions are functions which are independent of a particular system architecture or technology and which are also unaffected by particular operator procedures.  Functional reference points for these generic functions are established and the interfaces at these reference points are defined.  It is expected that this work will lead to:*

- *a solid foundation of the work on network transition strategies*

- *a limitation in the number of different implementations for generic functions*

- *a basis for realistic software reuse*

- *easier system integration through standard interfaces*

- *greater harmonization among protocols.*

- *a focus for the work in Part II.*

*The techniques to be investigated in part II, and especially the techniques related to the provision of functions (Advanced Information Processing and Programming Infrastructure) follow naturally from the FRM and the functional specifications.*

## 3.4.   Realisation Aspects

*'Reference Configurations' represent real network and system states and must contain sufficient implementation detail to  enable different states to be segregated; these states may differ in a variety of ways.*

*They may represent different real National network structures, for instance, or different hypothetical evolution steps, different regulatory or financial constraints or different demographic or terrain conditions.  The ultimate aim is to find routes forward towards the IBC, via achievable reference configurations, that are 'the best for Europe'.*

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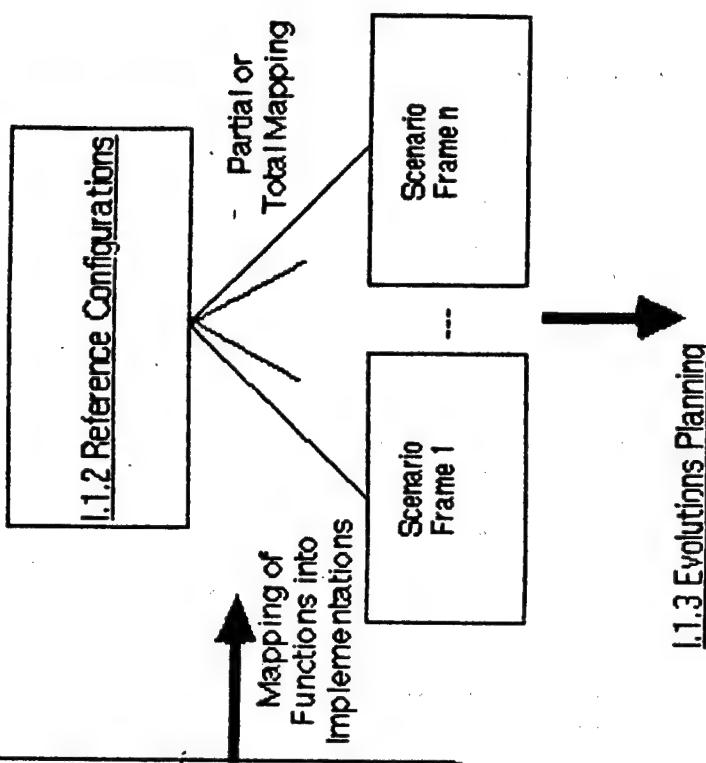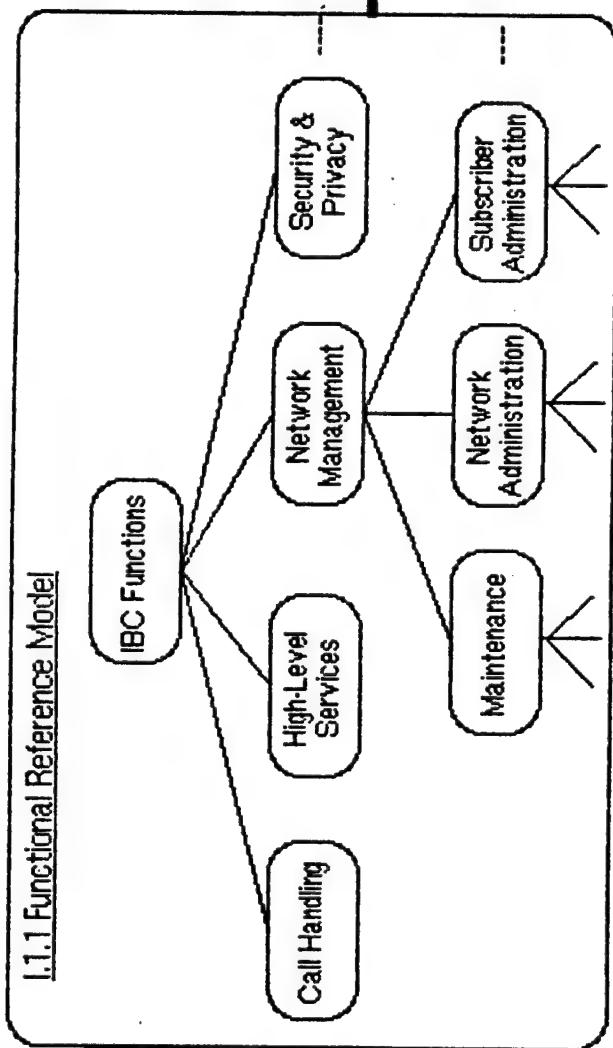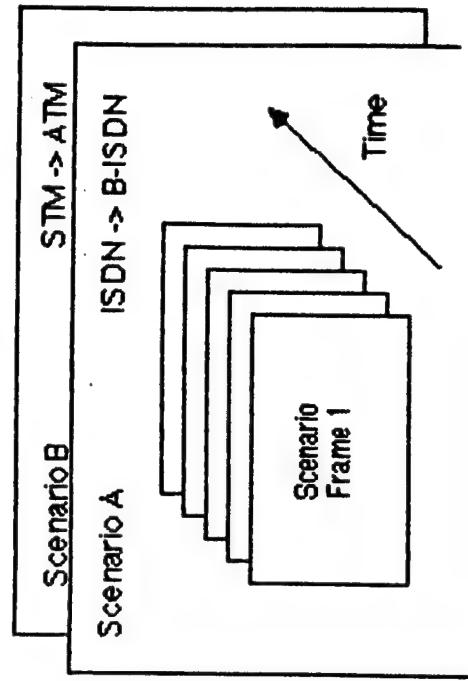
**I.1 IBC Strategies**

Fig 3. IBC Models

### 3.5.   Evolution Planning

### 3.5.1.   Basic Strategy

'Scenarios' are imagined sequences of reference configurations or subsets thereof ('frames' that carry some part of the network from one real or credible situation to another real o credible situation.   The aim of the _Evolution Planning_ activities is to find a set of scenario that represent cost-effective convergent routes towards the IBC.   This implies, for eac scenario,   choosing the 'optimal' set of reference configurations and 'sequencing' ther correctly.

The Evolution Plan will comprise a number of retained scenarios. Initially, there may b. different scenarios for different networks, but once we move clear of on-going planne evolutions, the various evolution paths will gradually converge onto one generic scenario.

### 3.5.2.   Support to Evolution Planning

In order to identify 'optimal' sets of reference configurations and scenarios, _criteria for choice_ are needed.   These are to be defined by a support activity called '_Techno-Economic Criteria for Evolution Planning_'.

A separate support activity will ensure that _interworking constraints_ and _gateway costs_ are properly accounted for.

It is also essential, in preparing the Evolution Plan, to seek for optimal levels of _Network and Service Integration_.

Three major evolutionary 'themes' have been identified for public and private wide-area networks.   These are:

continued exploitation of _Synchronous Transfer Modes_;

introduction of _Asynchronous Transfer Modes_;

evolution towards _Integrated Optical Networks_.

All are strongly technology-pushed developments and hence feature as such in the 'IBC Technologies' section.   At the 'IBC Realisation' level, on-going plans for ISDN within the framework of CCITT and CEPT cover both STM (where RACE work is likely) and conventional packet-switching (where RACE work is unlikely).   STM is thus covered as part of 'on-going transition plans'.

All of these aspects are brought together at the strategy level within the activity '_Network Evolution_'.

It is recognised that the constraints and opportunities that impinge upon the _Customer Premises_ and _Terminal_ areas differ from those affecting the wide-area networks and thus they are handled as a separate activity.

Finally, support is required to deal properly with all aspects relating to _mobile_ operation and interactions.

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┌─────────────────────┐
│  I.1.1. FUNCTIONAL  │
│      REFERENCE      │
│        MODEL        │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  I.2.1. IBC SYSTEM  │
│      FUNCTIONAL     │
│    SPECIFICATIONS   │
└─────────────────────┘
          │
          ▼
┌──────────────────────┬──────────────────────┐
│ II.1. TECHNIQUES FOR IBC │ II.2. PROGRAMMING │
│    SYSTEM FUNCTIONS   │   INFRASTRUCTURE   │
└──────────────────────┴──────────────────────┘
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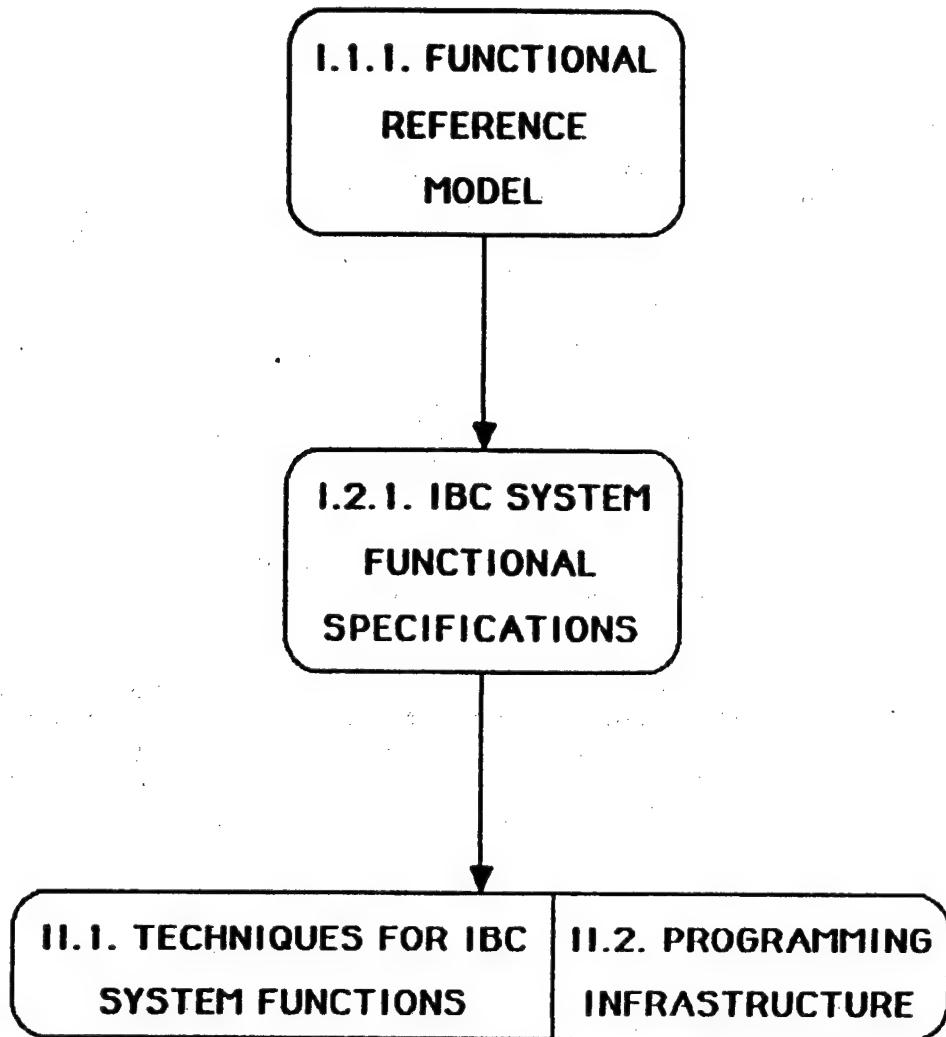
**Fig 4. Functional Aspects**

## 4.   GUIDELINES TO THE READING OF OTR-100

*The main purpose of the document is to provide work specifications to organizations wishing to propose their participation in RACE. For that reason, the document is made up of two distinct parts:*

A.   *Volume I is a description of:*

  *The issues addressed by RACE;*

  *The scope for RACE to influence those issues;*

  *The work to be undertaken.*

  *This descriptive text links together and logically positions the tasks relative to the overall objectives. IT IS THEREFORE RECOMMENDED THAT THIS VOLUME IS READ BEFORE THE TASK SPECIFICATIONS CONTAINED IN VOLUME II. References to the tasks are made using the following format:*

$$T.xyy$$

  *where x = 1, 2 or 3 indicates whether the task relates predominantly to Part I, II or III of RACE.*

B.   *Volume II consists of the specification of the tasks. Each task specification contains all the necessary information in terms of objectives, deliverables and milestones.*

VOLUME I: WORKPLAN DESCRIPTION

## CONTENTS

## VOLUME II: TASKS SPECIFICATION

## CONTENTS

CSO: 5500/A064-E

SPAG SEEKING COORDINATION WITH COS, MAP/TOP, POSI

Amsterdam COMPUTABLE in Dutch 1 May 87 p 1

[Article: "SPAG Starts with a European Workshop on Open Systems"; first two paragraphs are COMPUTABLE introduction]

[Text]  Amsterdam--The "Standards Promotion and Application Group" (SPAG) is currently undergoing extensive changes.

A so-called "European Workshop on Open Systems" has been set up and a reorganization is taking place allowing information system users to become members of the group for a certain period.

There is a growing need for consumer participation within organizations dealing with standardization.  This is increasingly true for SPAG, i.e., the 12 European companies which jointly select standards for the OSI [Open Systems Interconnection] reference model.  The 12 members have therefore decided to create a so-called "member forum."  External organizations can become members for a certain period and, thus, influence the activities of the group.  A reorganization is also being carried out at SPAG Services SA.  Originally set up by Bull, ICL, Nixdorf, Olivetti, Philips, STET, and Thomson to develop validation tests for products based on the OSI model, AEG, GEC, Plessey, and Siemens have now also decided to join this organization.  To improve cooperation with other "feeder" organizations such as the Corporation for Open Systems (COS), the MAP/TOP [Manufacturing Automation Protocol/Technical and Office Protocol] users group, and the Japanese POSI, SPAG has also decided to set up a "European Workshop on Open Systems" (EWOS).  This workshop fits into the three-layer model created by the various standards organizations to more or less structure the standardization process.

The above mentioned feeder organizations occupy the upper level of this model. They decide which standards are to receive priority (currently the X.400 standards and file transfer access and management).  One level below, on the so-called "workshop" level, are the many technical commissions.  EWOS can also be found on this level.  Technical specifications, which are subsequently sent to standardization organizations such as ISO [International Standards Organization], CCITT [Consultative Committee of International Telephone and Telegraph], CEN/CENELEC [European Standards Committee/European Committee for

Electrotechnical Standardization], and CEPT [European Conference of Postal and Telecommunications Offices], are elaborated at this level.

In June a number of standards organizations--including the restructured SPAG--will present this three-layer model.

25012
CSO: 5500/A045

BRIEFS

EUROPEAN MOBILE TELEPHONE AGREEMENT--Bonn (Reuter)--The German Ministry of Post and Telecommunications announced yesterday that four European governments have signed an agreement to standardize European mobile telephone systems. According to a ministry spokesman, this is an important step towards an integrated European telecommunications network. The system should be put into use in 1991. The signatories to the agreement are the FRG, France, Great Britain, and Italy. According to the plan, the system will eventually have 10 million connections: There are now 560,000 mobile telephone users in Europe. The agreement is also designed to encourage European telecommunications companies to form consortia that will compete with each other for the new system's orders. [Text] [Groot-Bijgaarden DE STANDAARD in Dutch 21 May 87 p 10] 25039

CSO: 5500/A049

ISDN   FINANCING   MODERNIZATION   OF COUNTRY'S PHONE   SYSTEM

55002534 Helsinki UUSI SUOMI in Finnish 4 Jul 87 p 8

[Article  by  Marja Uusitorppa:    "Telenet Modernization Costing  20  Billion
Planned for Helsinki and Kouvola"]

[Text]    The acronym ISDN (Integrated Services Digital Network) will pay  the
Finnish Telephone Co. 20 billion markkas in the next few years. In return  for
the  money  the  Co. will develop a faster and  more  efficient  multi-purpose
telephone network. It will be tried next year already in Helsinki and Kouvola.

In addition to regional telephone companies the venture includes the Post  and
Telephone  companies.  The installation of the first equipment will  begin  in
Helsinki this fall.

About 50 customers , chiefly from the central, Sornainen and Huopalahti areas,
will  take  part  in  the ISDN experiment of the  Helsinki  Telephone  Co.  No
agreements have been made with anybody yet, instead the marketing proper  will
begin in the fall.

"We  will  decide how the Helsinki experiment will be continued by  1989.  Our
intention  is to have the net covering Finland widely by the mid-1990's"  says
Matti Tossavainen, the chairman of the Telephone Company's ISDN project group.

Finland  is keeping up well with the international level. The question  is  of
worldwide modernization of telecommunications, which is currently underway  in
the US, Germany, France and England.

According   to  EEC  recommendations 80  percent  of  all  European   telenet
subscribers should be within the ISDN sphere by 1993.

Equipment Deals Already Made

The  Helsinki  Telephone  Co. will get its trial equipment  from  Siemens.  An
agreement  has been made with Tele-Nokia to supply similar equipment  for  the
operation beginning at the Mankka area of Espoo.

The  Post  and Telephone Co. has ordered equipment for its own  ISDN  ventures
from  the  same companies. It will begin its first tests in March of  1988  at

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Kouvola. At the beginning of 1989 a telephone center will also be located in a different community; preliminarily Hyvinkaa is considered a possibility.

Present Telephone Net as Foundation

ISDN today means the development of a digitalized telephone network so that in the future various teleservices can continually be added to it. Present telephone lines serve as a foundation to which new devices and improvements are made on the electronic side.

This so-called multiple function network is made possible by the fact that it is possible to simultaneously transmit speech, pictures, texts and data along telephone lines. For example the speed of automatic data processing will increase tenfold from the present.

The cost of the new telephone network is estimated by the association of telephone companies to be 20 billion markkas. The sum will be distributed over several years; the largest investment will take place during the 1990's.

Siemens informs us that the price of only one ISDN telephone is currently at least five times that of an ordinary telephone.

12989
@et

TELECOMMUNICATIONS AGENCY'S PURCHASE FROM NOKIA SETS RECORD

Helsinki HELSINGIN SANOMAT in Finnish 6 Aug 87 p 25

[Article:  "National Board of Post and Telecommunications Purchasing 400 Million Markkas in Equipment from Nokia, Finland's Largest Transaction in Data Transfer Equipment"]

[Text]  The National Board of Post and Telecommunications has concluded Finland's largest procurement agreement with Nokia for the purchase of telecommunications equipment.  If all the transactions connected with the 5-year contract are accomplished, the value of the transaction will be approximately 400 million markkas.

The procurements are a part of the telecommunications agency's program to modernize its mobile telephone network.

In the next 5 years, Nokia will deliver telephone exchanges to long-distance and local telephone networks and to the NMT 900-mobile telephone network.  In addition, the telecommunications agency will purchase cable line systems, channel equipment, and digital radio links.

The parts of the agreement that are fully binding between Nokia and the telecommunications agency are worth 130 million markkas.  Options or the accomplishment of provisos in connection with the agreement would increase the sum to a little less than 300 million markkas.

Nokia and the National Board of Post and Telecommunications have also concluded a 5-year general agreement, in which all the deliveries have not yet been nailed down.  Inasmuch as all the transactions contained in the agreement are realized, the value of all the procurements will be approximately 400 million markkas.

"Options Will Not Decrease Competition"

Nokia is the telecommunications agency's largest supplier of telecommunications equipment, the share of its deliveries is a little less than 50 percent.

Pekka Tarjanne, director of the National Board of Post and Telecommunications, says that options included in the agreement just concluded or the telecommunications agency's provisos to purchase additional equipment from Nokia in future years will place the company in a special position with respect to future deliveries.

"Competition will not be decreased with these options. There will be sufficient competition even if all the conditions of the agreement are accomplished," he says.

The National Board of Post and Telecommunications is under no obligation to purchase from domestic manufacturers.

"In the past, we have sometimes considered that it was in the public interest to order from the struggling Finnish telecommunications industry when employment conditions were difficult. Now there is no such situation," says Tarjanne.

The West German Siemens and Sweden's Ericsson, among others, are competing for the procurements now being made by the Finnish telecommunications agency.

The telecommunications agency's investment needs in telecommunications in the next 5 years will be approximately 1.2 billion markkas annually. The agreement concluded with Nokia will cover approximately 5 percent of this.

Mobile Telephone Network Full

The number of subscribers to the NMT-450-mobile telephone network, which was put into operation 5 years ago, has increased considerably more than expected, and the network has become congested in Southern Finland.

The telecommunications agency has begun building a new NMT-900-network, which can accommodate more customers than the old network. The first NMT-900 exchange will be put into operation in Helsinki already in the spring.

Nokia will deliver new mobile telephone exchanges to Turku, Tampere, and Helsinki.

Long-distance exchanges manufactured by Nokia will be delivered to Jyvaskyla, Lahti, Kouvola, and Mikkeli.

The equipment to be delivered in accordance with the agreement concluded on Wednesday will be manufactured at Nokia's Espoo, Aanekoski, and Haukipudas plants.

The invoicing for Nokia's data transfer equipment has increased 30-40 percent annually in recent years. This year's billing is approximately 3 billion markkas. Exports account for approximately 70 percent.

10576
CSO: 3617/2540

BRIEFS

MINISTRY APPROVES SWITCHING PURCHASE --The Ministry of Transportation gave the Post and Telephone authorities permission to order over 28.5 million markkas worth of switching equipment. Switching devices to be ordered from Tele-Nokia will cost over 18.5 million. The price does not include sales tax. The Post and Telephone Co was authorized to order nearly 10 million markkas worth of switching equipment from L.M. Ericsson. This price does include the sales tax as well. Shipments will begin in 1988. [Text] [55002534 Helsinki UUSI SUOMI in Finnish 9 Jul 87 p 6] 12989

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THOMSON-CSF OF FRANCE IMPROVES TRAVELING WAVE TUBE TECHNOLOGY

Paris ELECTRONIQUE ACTUALITES in French 15 May 87 pp 1, 20

[Article by G. Cuciuc]

[Text]  Having been involved in more than 20 major European and international
space initiatives, Thomson-CSF of France's Electronic Tubes Division is
continuing to move ahead in the area of space technology.  More than 400
types of TWT's (traveling wave tubes) have been delivered by Thomson, and 190
of them are being used on satellites currently in orbit, with a total of more
than 2 million hours of flying time.  Based on experience, the service life
of Thomson TWT's is over 11 years.  However, in light of competition from
"cable systems," it is becoming evident that the useful life of satellites
will have to be doubled--from 10 years currently--hence the necessity for
Thomson to continue improving its transmission tubes.

In anticipation of satellite ventures in the 1990's Thomson, as the world's
sole producer in the "ground and onboard" tubes market, has already increased
the versatility of its TWT's.

2 GHz Pass Bands

Thanks to the so-called "brazed-propeller" technology, 30-120W improved-
version TWT's have been perfected for use with future generations of medium-
sized telecommunications and live-television transmission satellites.
Characterized by an efficiency rate which is typically greater than 50 percent--
as opposed to 40 percent in older-generation satellites--this was achieved by
using a much wider pass band of about 2 GHz providing versatility as well as
a three-fold reduction in weight.  One must also keep in mind that only a
10 percent increase in efficiency is possible every 10 years.  Thomson, in
association with the CNET, is currently developing a TWT model with radar
applications.

Flawless CCD's

Besides their TWT activity, Thomson is developing charge-coupled devices
(CCD's) for use in space with onboard applications such as:  telescope sights,
earth observation, astronomy, etc....  Produced on MOS-VLSI processing lines,
these units offer some of the most advanced complex memory capabilities

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approaching "flawlessness." Thomson is the only producer in Europe of CCD's geared to scientific use. Thomson is currently developing a MIR detector for the SPOT IV program which will be produced in a solid state having 300 components made of In, Ga, and As, with CCD multiplex able to support up to 3,000 elements. A 1024x1024 matrix should be available soon.

Space Revenues Near Fr 190 Million

Thomson's space effort--involving 250 employees--represents about 12 percent of the compnay's Electronic Tube Division's activity, or roughly Fr 190 million.

13307/13046
CSO: 3698/511

74

SIEMENS FRANCE SEEKING PART OF PRIVATE TELEPHONY MARKET

Paris L'USINE NOUVELLE in French 18 Jun 87 p 26

[Article by Jean-Pierre Jolivet: "Siemens: Fayard at the Outpost"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Christian Fayard, chief executive officer of Siemens SA since early May, is in the middle of negotiations that agitate French private telephony.

Since he arrived to head the French subsidiary of Siemens, Christian Fayard has been very much in demand. Events have left him no respite. With the CGCT [General Company for Telephone Engineering] takeover only just completed, the new CEO of Siemens France is at the heart of discussions which are agitating French private telephony. This does not displease the 54-year-old Ecole Polytechnique graduate and telecommunications engineer, who was assistant managing director in charge of public switching at CIT-Alcatel for 10 years.

"Our aim is to strengthen our position in the French market," explains Christian Fayard, "and we are therefore on the look-out for opportunities. There is no question, however, of signing agreements outside the scope of Siemens' global strategy." In 6 months Christian Fayard has managed to absorb the company spirit governing the German giant's strategy.

Today telecommunications seem bound to become the catalyst of Siemens' French offensive. Jeumont-Schneider, Siemens' partner in the CGCT takeover, is seeking an agreement with a foreign firm for its private telephony activities. "We remain in contact," explains Christian Fayard, "the problem is finding a cooperative synergism between the two companies." A participation in Jeumont-Schneider combined with technical cooperation would give Siemens access to the French private telephony market, which has so far been highly protected. The management in Munich, which has long been dreaming of this, would consider it a "fair return" for the arrival of Alcatel NV--via SEL [Standard Elektrik Lorenz]--on the German telecommunications market. The advantages of such an association in the electrical engineering sector, accounting for 70 percent of Jeumont-Schneider's activities, still remain to be identified.

According to Christian Fayard, Siemens' French ambitions do not stop there. Its target is to make Siemens SA climb several steps in ranking. It is now the 8th foreign industrial group in France, with Fr 3.4 billion in sales, 3,700 employees, 3 manufacturing plants, and 6 establishments. "Our

priorities for reinforcement will be high-tech sectors such as medicine, automation, and integrated circuits for telecommunications, where we already hold favorable positions," he emphasizes. For example, with Fr 460 million in 1986 revenues in the medical sector, Siemens holds 20 percent of the French market, beside CGR [General Company for Radiology] and Philips. The company is determined to strengthen this position with the arrival of its new NMR [nuclear magnetic resonance] equipment. Other sectors, such as factory automation, will not be forgotten, and Siemens expects to increase its 2-percent share in the French electronics and electrical engineering market.

25046
CSO: 5500/A053

TDF1 SATELLITE: PUBLIC, PRIVATE FUNDS STILL IN QUESTION

Paris LE MONDE in French 14 Jul 87 p 9

/Article by Pierre-Angel Gay/

/Text/ Television networks selected by the CNCL /National Committee for Communications and Freedoms/ to hook up to the TDF1 satellite are questioning the sharing of state and private financing. Will the government be forced to make a new effort to provide financing despite pressures by liberal ministers?

Those audiovisual "wise men" skillfully "scored a touchdown" on 10 July. Caught in the trap of a difficult satellite case, they put off until later any definitive arbitration. They were content, for the time being, to make a "rough" selection among network candidates to make use of a TDF1 satellite channel. Thus, foreign television stations with "badly gotten up" files, such as Bravo TV, Olympia and Visnews, did not make the grade, while TF1, Canal Plus, Cinq and M1 were "preselected."

The CNCL thus "limited the number of players," as one of the officials put it. It then returned the ball to the field, calling on the partners not to come back to it until once the game rules had been clarified by the government. TDF, that manages the satellite file, and the big network candidates are thus face to face with the administration--that would have gladly done without this--as arbitrator.

On two occasions already the government has been forced to reaffirm its "attachment" to French television programming by direct satellite. It had, on that occasion, clearly defined the responsibilities of each party. The state performed its role "of initiator and instigator" by paying the entire bill for the TDF1 satellite--i.e. 1.8 billion francs. At the Ministry of the Budget the following was being said: "Reservations for the firing step and insurance included." However, the private sector had also expressed its interest by undertaking the construction and launching of TDF2, the indispensable suppport satellite.

It is this arrangement, this division of risks and responsibilities between the state and the private sector that is today being questioned. TDF, entrusted with setting up a satellige business firm (Tevespace), has, in fact, completed its part of the bargain and feels that it has become necessary--in order to assure profitability of the operation--to demand a rent of an average of 120 million francs a year from future network leaseholders for television channels. A large

sum, to which one must still add a share of 40 to 50 million francs to Tevespace's capital, a reimbursable advance (after 8 years) of 130 million francs, as well as a penalization indemnity, equivalent to 4 years' rent, in case the contract is broken!

One candidate states, "It is quite simple. We are asked to pay half the TDF2 construction costs. However, we feel that we should not assume this industrial risk besides the commercial gamble that is demanded of us." The refusal is firm and unanimously shared by the four French networks concerned. Another of the protagonists stresses, "Either the state puts aside 600 million francs so that the rates that have been authorized for us be cut in half or else the affair will not get off the ground."

A tactical statement? That is what some people hope. Mr Xavier Gouyou-Beauchamps, TDF president and director general, was reassuring by noting, "Negotiations have not begun." Nevertheless, experts as a whole, as well as various advisers of ministerial offices concerned, think that the chances of succeeding on these bases are slim, even non-existent. At the Ministry of the Budget the following is being said: "Nevertheless, we should not be misunderstood. It is not a question for us to subsidize the operators." Mr Alain Juppe's associates well remember the terms of the interministerial arbitration of last Feburary: if the operators refuse the conditions made to them, Tevespace will not be built nor the support satellite completed. TDF1, directly exploited by the public sector, would then be put into orbit but simply for "experimental purposes that remain to be defined." The decision, it is added, was "clearly settled in its time. There is no question of going back on it."

At the Ministry of the Budget, just as at the Ministry of Culture and the Ministry of Communications, officials have, indeed, been convinced that television satellites have now entered the market economy era. They have also been convinced that if the TDF1 and TDF2 system, already 50 percent subsidized by the state, does not find a taker it is because it does not really meet the needs of the operators.

This liberal vision of matters disregards other stakes: political, industrial and technological. Political because the TDF1 and TDF2 program is based on a Franco-German agreement that would then be questioned. Industrial because thanks to the D 2 Mac Paquet standard, that would be the TDF1, European industrialists would be able to confront Japanese competition under better conditions. Finally, technological because only the capabilities of a "heavy" satellite such as the TDF1 would favor imagery evolution toward high definition television. These are three considerations that weigh heavily for France's future. Could the government not reckon with this?

5671
CSO: 5500/2537

BRIEFS

FRENCH TELEACTION NETWORK--The ASTARTE system (Teletex Security Access to the Teleaction Network) is currently being tested on a natural scale by the French Telecommunications Authority (DGT).  This network provides subscribers with a slow speed exchange of data concerning remote alarm, monitoring, management and control functions as well as other functions which will be added at a later stage.  The users of this network will be companies (technical services for lighting, preventive maintenance, access control, etc.), or private individuals (welfare-orientated service for the safety of persons and property).  This new service uses the subscriber's telephone line for simple connection.  The teledata is superimposed on the voice transmission via a supravocal coupler.  The communication is two-way.  A transmission chain monitoring system is included (scanning sequence of some 3 seconds).  The messages (maximum of 24 octets) are transmitted in 10 seconds via a 300 baud network (the capacity will be increased at a later stage to 1,200 bauds).  The teleaction system is built around user and network equipment. From the user's end, the separation between telephone and teleaction access is via two couplers at the user and exchange ends of the line.  The network equipment consists in a subscriber concentrator (or teleaction terminal concentrator) with a capacity of 192 access points and a telecommunications operation unit which can manage up to 16,000 lines and 32 exchanges.  The French Telecommunications Authority  has advised that the equipment at the user end will be open which means that service companies will be able to offer their own equipment, the only necessity being an adaptor piece with the ASTARTE protocol.  The decision to introduce the ASTARTE  system should be made within the coming weeks, some 5,000 access points are planned for Paris and its suburbs. [Text] [Paris FTS--FRENCH TECHNOLOGY SURVEY in English May 87 p 2]


MULTIPURPOSE ISDN EXPERIMENT--Apart from the narrow-band ISDN (Integrated Services Digital Network) being developed, Prelude is proposing the creation of a universal data transfer infrastructure.  This system would be a telecommunications ISDN capable of handling signals of all kinds (low data rate, still images such as those for videotex, large computer data files, telephone, radio or high fidelity sound, televised or picturephone animated images...).  It would use the multiplexing and switching technology somewhere between circuit mode and packet-switched mode of the ISDN called Asynchronous Time Technique.  The integration successfully achieved by a team at the CNET French Telecommunications Research Center has a switching matrix, a user terminal and audiovisual and data terminals.  This experiment has proven that it is possible to use available technology to apply asynchronous time techniques to wide-band networks, and that the technology that will appear on the market by 1990 will make this type of technology economically feasible for the final user within a short space of time.  [Text] [Paris FTS--FRENCH TECHNOLOGY SURVEY in English Jun 87 p 6]

CSO:  5500/A061

ITALIAN ISDN EXCHANGE PACKET SWITCHING DESIGN VIEWED

Milan ALTA FREQUENZA in Italian No 3, May 87 pp 15-22

[Article by Giulio Barberis, ITALTEL, Milan; and Luigi Musameci, Electronics Department, University of Pavia: "Lines of Evolution in the ISDN"]

[Excerpts]   This article first discusses the network architecture established by Recommendation X.31 [of the International Telegraph and Telephone Consultative Committee -- CCITT], which constitutes the basic reference for the integration of the packet switching services in the ISDN network.   The article then goes on to examine the architecture problems in the ISDN concerning full integration of the new narrowband and wideband packet switching services which, in addition to the definition of new interfaces, will also require introduction in the network of ATD [Asynchronous Time Division] and FPS [Fast Packet Switching] techniques.

Finally, with reference to the ISDN pilot service promoted in Italy by SIP [Italian State Telephone Company], the article looks at ways in which Italtel has developed the ISDN.

These developments are based on the UT line digital exchanges.   The modular structure of these exchanges means that they will [initially] be able to supply narrowband ISDN services, with the addition of wideband services at a later stage simply by adding hardware and software modules to the basic configuration.

New Switching Techniques

In [Footnote 1], [J.J. Kulzer, W.A. Montgomery:  "Statistical Switching Architectures for Future Services," ISS 1984, Florence], Kulzer and Montgomery examined various methods of transmitting services in an integrated network. As used to date, the conventional packet switching method has proved to be highly flexible in handling variable speed data streams.   On the other hand, while the flow and error control procedures make it possible to achieve a high-performance service, they nonetheless introduce quite long processing times which can lead to considerable delay times in certain packets. Therefore, conventional packet switching does not lend itself to services such as voice transmission which require low delay times for all packets.  As shown in (1), the FPS technique is the most flexible method for handling all types of services in an integrated network.

Like conventional packet switching, FPS uses the transmission lines as digital pipes for the transfer of information packets. The information contained in the packet header identifies the connection to which the packet belongs. Using this method of multiplexing, the variable band connections are handled in the simplest and most logical way.

On the other hand, FPS adopts simpler protocols and routing methods than those used by conventional packet swithching. All packets relating to a given call follow the same route selected during the setting-up of the connection, while the FPS nodes perform the packet switching only, without introducing procedures for processing the information or for recovering lost or distorted packets.

To be able to meet the requirements of the entire range of ISDN services, from voice [transmission] to data and televsion [transmission], an FPS switch would have to be capable not only of handling a throughput on the order of 1 Gbit/s, but also of introducing overall processing and switching delay times of no more than 1 ms. It is clear that if a high-capacity, low-delay switch is to be produced at a reasonable cost, one has to think in terms of architectures based on the use of few VLSI [Very Large Scale Integration] components.

A switch with these characteristics can be obtained using multipath architectures. In these architectures, the total switched band is not linked to the speed of the single path available--as was the case in the single-path architectures used until now in data networks--but increases with the number of interfaces used. Multipath architectures have been used extensively in circuit switching. However, if the route between a node input and node output had to be selected for each packet, the number of routings to be effected per second in an FPS node would be extremely high. Therefore the only way to solve this problem is to utilize self-routing networks or in other words, networks in which the routing is selected by each individual component constituting the connecting network.

The networks normally used in circuit switching are either Clos networks or Benes networks. Although these networks offer the great advantage of being non-blocking, they cannot be used with packet switching because no way has yet been discovered to make then self-routing.

A valid alternative to the above is represented by Shuffle networks, which employ a small number of crosspoints and a simple routing algorithm. Different self-routing Shuffle network topologies are known as Banyan networks, Omega networks, and so on. Figure 3 [not shown] illustrates the structure of a Shuffle network.

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There is one major drawback to these networks, however, which is that they are blocking. This problem can be alleviated by implementing a system in which the connecting network operates at a higher speed than the access connections. Another method of reducing the blocking is to add input stages in order to distribute traffic randomly at the switching stages.

There is also another problem connected with these networks. This is the problem of conflicts [between calls], which occur when several packets arrive simultaneously at the same connection (internal or external). This problem is solved by stacking the packets in a buffer memory until the connection becomes available. It is clear that the larger the number of buffer memories [used] the greater the throughput that can be handled; on the other hand, to do this makes the node both more complex and more expensive. One final disadvantage [of these networks] is their poor resistance to faults, something which can be improved by using structures with redundancy as required. Today, using VLSI technology, it is possible to produce FPS nodes with architectures based on buffered Shuffle networks, with throughputs of 1 Gbit/s and delay times of less than 1 ms.

In the definition of a possible network architecture, FPS nodes could be employed in the junction network, while the local access network would still employ digital exchanges incorporating the interface units necessary for access to the FPS junction network. The junction circuits would have to operate at high speeds of at least 2 Mbit/s.

Within the network, the construction of the virtual circuits would incorporate the common channel signaling system No. 7 established by the CCITT, provided that this was already available and was capable of supplying adequate performance in terms of the formation of virtual circuits. Alternatively--and perhaps this is the most likely prospect--the virtual circuits would use the FPS network, employing connection control packets with procedures based either on the application of common channel (level 4) or directly on Recommendation I.451. These procedures would be implemented by special modules incorporated in the FPS nodes.

Evolution of Packet Switching Services in the ISDN

In connection with the evolution of packet switching services in the narrowband ISDN (up to 2 Mbit/s), work is being done to define a new user interface to take the place of the X.25 interface.

The basic principles of this new interface, known as the New Packet Mode, are now consolidated; virtual call control is effected outside the band and the transfer protocol in the data phase has to be as simple as possible and has to be diversified, depending on whether the information stream through the network is to be transferred rapidly or dependably [Footnote 2] [G. Barberis,

M.R. Guarnieri, P. Macrina: "Handling Packet Services Within ISDN," Computer Communications, June 1987]. Bearing in mind that the level 2 LAPD [expansion unknown] protocol and the signaling established by Recommendation Q.931 constitute the starting point for future developments, definition of the new packet switching interface will require the following:
- introduction of additions to Recommendation Q.931 for the control of packet switching on channels D, B, and H;
- application of LAPD protocol (Recommendation I.441) also on channels B and H;
- introduction in the LAPD protocol of multiplexing functions for the frames relating to the different virtual calls on channels B and H;
- introduction in the LAPD protocol of flow and error control funtions, to be requested on a call-to-call basis related to the class of service selected by the user [Footnote 3] [P. Buzzoni, G. Cappellini, M.R. Guarneri, P. Macrina: "Congestion Control for Data Packet Transport in an ISDN Environment," Third International Conference on Data Communications System and Their Performance, Rio de Janeiro, 27 June 1987].

Network signaling wil be based on CCITT common channel signaling system No. 7 for all types of circuit switching and packet switching services.

The evolution of packet switching services cannot be divorced from the evolution of the network architecture. During the initial phase, the network handling of packet switched traffic--primarily data traffic--will be effected using HDLC [High Level Data Link Control] techniques with simplified handling of leveL 2 protocols in the transit exchanges.

Figure 4 shows the data phase protocol architecture for wideband ISDN using HDLC techniques.

This [process of] simplification, made possible by the error rates expected [to be achieved] in digital network circuits, will permit a fuller utilization of the network switching and transmission capabilities, with positive effects for the cost of ISDN services. Two basic options are planned; the first one concerns services with no verification or flow control and with stringent real time requirements; the second option concerns services which, since they require verification procedures and flow control, entail level 2 edge-to-edge handling.

The fact that the network has no level 3 for the data phase means that virtual call multiplexing has to be effected at level 2. Thanks to the capabilities of the address field of the LAPD protocol, it is possible to perform level 2 multiplexing on the same physical level.

Switching of the frames has been made particularly simple in the transit nodes, since the retransmission and flow control procedures have been eliminated. In the local exchanges, which is where the network-user interfaces

are located, both the above options must be provided.

The FPS technique will make a further improvement in quality possible; the substantial increase in the processing capabilities of the packet switching nodes will make it possible to absorb all types of traffic in a single network infrastructure. It is clear that if the advantages offered by FPS are to be exploited fully, a new asynchronous line interface (ATD [Asynchronous Time Division]) will have to be defined.

In this connection, we should point out that the ISDN studies carried out so far point to ATD as the most valid technique for general handling of packet switching services. With ATD, both the network transmision capabilities and the network switching capabilities can be allocated dynamically by segmenting the information streams into blocks (16-32 octets), each one of which is identified by a special label consisting of 3-4 octets.

The wideband systems currently being developed in the United States and Japan are in fact based on ATD. It has been said that asynchronous techniques represent a major turning point in telecommunication technology, comparable to the developments which marked the transition from analog to digital technology.

The advantages offered by ATD include:
- the ability to handle burst mode information streams efficiently, without the limitations imposed by the time division technique;
- Flexible redistribution of the network capabilities to match the evolution of services;
- efficient use of transmission and switching capabilities;
- the ability to handle a wide variety of data services at any given time, from low speed data [transmission] to high definition television services;
- ready assimilation of technological innovation.

FPS could well find its first application in narrowband ISDN transit nodes, based on the network architecture for data services shown in figure 5. The conversion function between HDLC and ATD (fig.6) would have to be located in the local exchange.

The handling of services requiring verification capabilities will require implementation of level 2 procedures in the local exchange (edge-to-edge) above the ATD level.

The incorporation of FPS nodes and ATD capabilities during the phase in which narrowband ISDN is implemented would mean that it would be possible to develop a powerful network infrastructure gradually and would ease the transition to the second phase of the ISDN involving the introduction of wideband services such as voice and image [transmission].

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The level architecture of the network protocols for wideband ISDN is shown in figure 7; at this stage, implementation of ATD would be extended to also include the user interfaces. In the local exhange, pure ATD is used for traffic with no verification or flow protocol. In the case of traffic requiring controls of this kind, however, it will be necessary to employ a level 2 edge-to-edge protocol above the ATD level.

While the ATD technique is restricted to level 1, operation of the higher network levels must be organized as necessary if the services to be implemented are to be handled correctly.

Figure 8 shows the functions (level 1 functions) and services offered by protocol X.21, as well as by ATD protocol, by X.25 level 2 and level 3 protocols, and by level 2 ISDN protocol (LAPD). It can be seen from the figure that it is necessary to adapt the OSE [Open System Architecture] model to the description of packet switched data handling in ISDN.

The UT Line Exchanges for ISDN

The UT line exchanges have a distributive-type modular architecture (fig. 9). The modules constituting the exchange are classified as follows:
- peripheral modules for handling the user and junction lines; each peripheral module is capable of performing the entire range of switching functions;
- interconnecting structure; in the configuration of the VT100 this consists of a connecting network of channels operating at 64 Kbit/s and of a message distribution module (MDM) which enables the peripheral modules to communicate with one another;
- modules for common management and maintenance functions.

The exchange that will be used for the initial phase of the ISDN pilot service is the UT10 digital exchange. This uses M2 peripheral modules and has an interconnection structure consisting of a complete mesh of cables (11). The ISDN UT local exchanges will be interconnected by means of the TN16 digital transit exchange in order to guarantee user-to-user digital connections at 64 Kbit/s. The local exchanges will also be connected to the telphone network for the normal telephone service.

The peripheral modules in the ISDN/UT exchanges will be equipped with specialized units known as PHP (Protocol Handling Processor) for handling the level 2 signaling protocols (LAPD) at the user-network interfaces (fig. 10). It is planned to use the interfaces standardized by the CCITT, that is, the interfaces for 2B+D base access at 144 Kbit/s and the interface for 30B+D primary access at 2048 Kbit/s.

The CCITT common channel signaling system No. 7 will be used for the signaling

for the control of circuit switched calls between exchanges, while the signaling at the user-network interface, carried on channel D, is in line with Recommendation Q.931. Handling of X.25 packet switching service terminals is based on the maximum integration scenario established by Recommendation X.31 (12). During the initial phase, the packet switching service will be offered on channel B.

In order to ensure compatibility with the signaling procedures established by Recommendaton Q.931, the terminals will be fitted with an external adapter. In this way, it will be possible, on the basis of both incoming and outgoing calls and with signaling on channel D, to switch channel B toward the PH (Packet Handling) module which provides the packet switching function according to protocol X.25 (fig. 10). The PH module is capable of exchanging signaling messages with the control of each peripheral module for handling of the 64 Kbit/s internal channels between the PH module and the peripheral modules to which ISDN users are connected.

In addition, the PH module acts as an interconnection with the ITAPAC network according to the Recommendation X.75. Through ITAPAC, packet switched traffic is transmitted between ISDN users adn ITAPAC users, while transit packet switched traffic is transmitted between ISDN islands.

The modular structure of the UT line means that it will be possible to incorporate further developments in packet switching services, from those based on the New Packet Mode interface (narrowband ISDN) to those that will be implemented at a later stage for wideband ISDN.

In order to be able to upgrade the narrowband ISDN packet switching services, it will be necessary to broaden the control of packet switched calls in the Q.931 signaling procedures; it also will be necessary to expand the interconnection structure with switching stages dedicated to the HDLC frames (fig. 11). These stages would have to be interconnected to the second generation PHP's located in ISDN modules and capable of carrying out peripheral handling of the new user interface and the HDLC junction interface toward the transit nodes. The availability of these switching stages would allow a flexible dimensioning of the exchanges based on the coexistence of different modules.

With regard to wideband ISDN, the studies for the definition of the level 1 user-network interface are still in the initial stages. While [in theory] it would be possible, using the packet ATD interface, to implement centralized management of all the services, in practice it may well prove preferable to implement hybrid access which would make it possible to assign variable speed channel to subscribers on the basis of a synchronous frame. In any case, however, the most realistic approach would appear to be that of designing additional modules dedicated to wideband operation (in other words, in line with the UT line architecture), specialized wideband ISDN modules for

peripheral handling of the user and junction interfaces involved, and FPS interconnection structures (fig. 11).

Once the FPS stages become available, it may well be advisable to bring forward the introduction of FPS, implementing this technique in the narrowband ISDN in order to meet the requirements of substantial increases in packet switched traffic, while at the same time equipping the PHP modules with ATD interfaces on the junction side.

While the studies are going forward, both the FPS and the ATA [expansion unknown] techniques are becoming increasingly widely accepted, and it is widely believed that these are the most appropriate techniques for future implementation of a single management system of all the services.

At an industrial level, the fact that the introduction of the network services will have to be a gradual process means that the modular architecture of the UT exchanges represents a line of development which is capable of accepting standardization of the ISDN in the future based on current orientations.

Figure 4 Architecture of data phase protocols: evolution of packet switching services in narrowband ISDN.
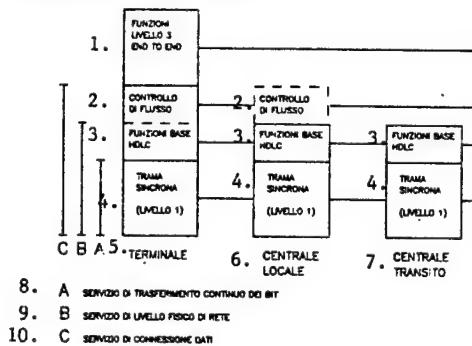


Key:
1. End-to-end level 3 functions
2. Flow control
3. Basic HDLC functions
4. Synchronous frame
5. Terminal
6. Local exchange
7. Transit exchange
8. A. Continuous bit transmission service
9. B. Service of the physical condition of the network
10. C. Data connection service

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Figure   5   Network   architecture   of   the   packet   switching   service   in narrowband ISDN utilizing an ATD network infrastructure.



3. UNA ARCHITETTURA DI RETE PER IL SERVIZIO DATI ISDN
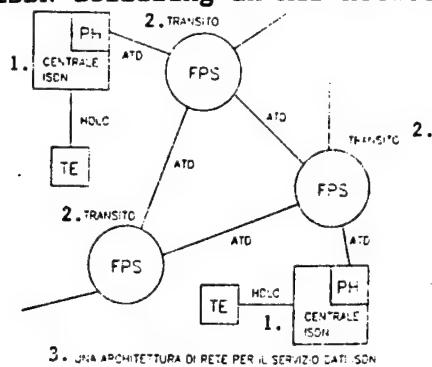
Key:

1.  ISDN exchange
2.  Transit
3.  A network architecture for the ISDN data service

Figure 6   Architecture of data phase protocols:   narrowband ISDN utilizing an
          FPS network infrastructure.



Key:
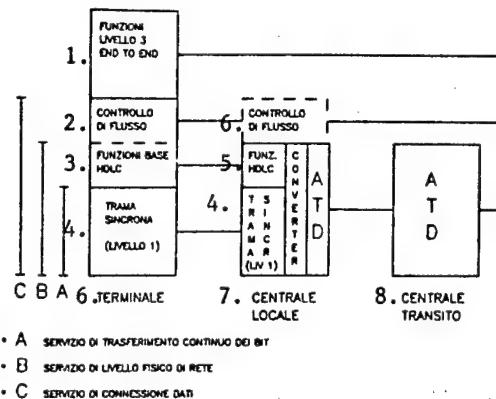
1.   End-to-end level 3 functions
2.   Flow control
3.   Basic HDLC functions
4.   Synchronous frame (level 1)
5.   HDLC functions
6.   Terminal
7.   Local exchange
8.   Transit exchange
9.   A. Continuous bit transmission service
10.  B. Service of the physical condition of the network
11.  C. Data connection service

Figure 7 Architecture of data phase protocols: ATD service to the user interface.



Key:
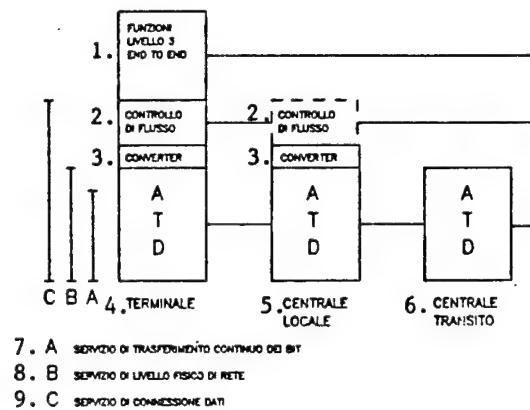
1. End-to-end level 3 functions
2. Flow control
3. Converter
4. Terminal
5. Local exchange
6. Transit exchange
7. A. Continuous bit transmission service
8. B. Service of the physical condition of the network
9. C. Data connection service

**Figure 8    Functions of the OSI levels and their structure compared to certain other communication protocols.**
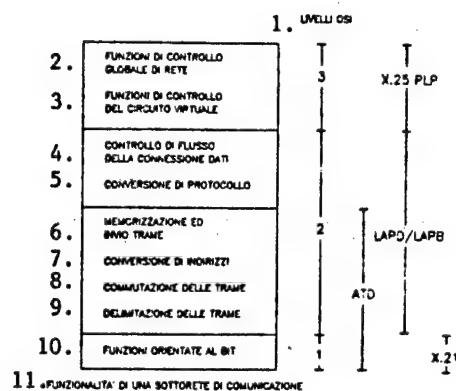


Key:

1.  OSI levels
2.  Global network control functions
3.  Control functions of the virtual circuit
4.  Control of the data connection stream
5.  Protocol conversion
6.  Frame storage and dispatch
7.  Address conversion
8.  Frame switching
9.  Frame definition
10. Bit oriented functions
11. Functions of a communication subnetwork

Figure 9  Configuration of automatic switch in the UT line



1. LINEA UT: TELEFONIA ANALOGICA

2. Modulo Periferico Utenti (max 2000) M2

STRUTTURA DI INTERCONNESSIONE 4

2. Modulo Periferico Utenti (max 2000) M2

Modulo Commutazione Circuiti Numerici Fonia CBM

2. Modulo Periferico Utenti (max 2000) M2

2. Modulo Periferico Utenti (max 2000) M2

Modulo Commutazione Messaggi Segnalazione MDM

3. Modulo Periferico Giunzioni (max 1000) M3

7. Esercizio e Manutenzione

Key:

1.  UT line:  analog telephony
2.  Peripheral module, users (max. 2000)
3.  Peripheral module, junctions (max. 1000)
4.  Interconnection structure
5.  Module for switching of digital circuits for voice services
6.  Module for switching of signaling messages
7.  Operation and maintenance

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Figure 10    UT  exchange for the ISDN pilot  service:   the  Packet  Handling
             [PH]   module   is connected with the M2 modules  (max.  16)  in  a
             complete mesh.
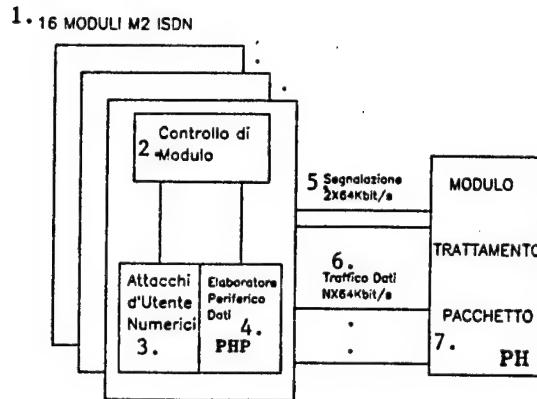


Key:

1.   16 ISDN M2 modules
2.   Module control
3.   Digital user attachments
4.   Packet Handling Processor (PHP)
5.   2 x 64 Kbit/s signaling
6.   N x 64 Kbit/s data traffic
7.   Packet Handling (PH) module

Figure 11    Functional   blocks in a   modular-type   exchange   with   integrated
              narrowband   and wideband ISDN services and shared interconnection
              structure.
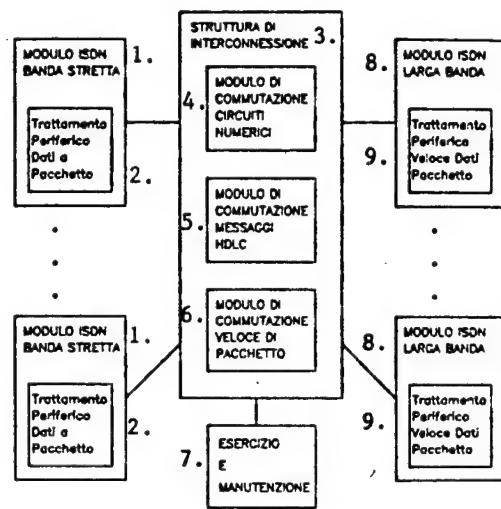


Key:

1.  Narrowband ISDN module
2.  Peripheral handling of packet switched data
3.  Interconnection structure
4.  Switching module for digital circuits
5.  Switching module for HDLC messages
6.  Fast Packet Switching module
7.  Operation and Maintenance
8.  Wideband ISDN module
9.  Fast peripheral handling of packet switched data

8616
CSO:   5500/M363

BRIEFS

TELETTRA TELECOMMUNICATIONS FOR VENEZUELA -- Venezuela's Compania Anonima Nacional Telefonos has placed an important order with Telettra, (Fiat Group) for the development of advanced telecommunications installations in the fiber optics sector, which indicates the high level of competitiveness reached by the Italian company.  The contract covers the creation of interconnecting networks for the Caracas switching exchanges and for those of the central littoral cities and Valencia.  The contract, worth $16 million, is for the supply and installation of 58 connections on monomode optic fiber operating at 140 Mb/s for a total of 192 km of cable (equal to 2940 km/fiber), 310 optic line terminals (with LED or laser sources), 1,850 multiplexers and 980 30-channel multiplex terminals.  In addition, a centralized monitoring system will be provided, allowing monitoring of the entire transmission network.  In addition to the supply and installation of the equipment and cable, the contract covers the services necessary for system start-up training, to be carried out both in Italy and in Venezuela, and the creation of a maintenance center and training center.  [Text] [Turin MEDIA DUEMILA in Italian No 6 Jun 87 p 106] 8627

CSO:  5500/M334

NORDIC CULTURE MINISTERS CREATE FOUR TELE-X CHANNELS

Oslo AFTENPOSTEN in Norwegian 13 May 87 p 3

[Article by Odd Inge Skjaevesland:   "Culture Ministers Agree on Four Tele-X-Channels"]

[Text]   There will be four Nordic TV channels from the Tele-X satellite. Sweden's culture minister gave up his fight for two edited channels.  However, future commercials could create problems for the Nordic TV cooperation.

According to a unanimous proposal by the cultural committee of the Nordic Council yesterday,  Norway,  Sweden,  Finland,  and Denmark will each transmit directly on one TV channel.   The national companies will participate. Private ones will not be admitted.   According to the plan,  three-year test programs will start in the spring of 1989.

Accepted

None of the four channels will be edited.   "I believe it would have been best to edit the programs, but I accept four direct ones because there is such wide agreement about this.   I feel neither run over nor ill-treated," Swedish culture minister Bengt Goeransson tells AFTENPOSTEN.

Goeransson together with culture minister Hallvard Bakke and their new Finnish colleague Christoffer Taxell will adopt a formal resolution regarding the four channels at a meeting on 16 June.   Thus,  this will replace a six-month-old decision by the culture ministers of the three countries in favor of two edited TE1E-X channels.  Both Taxell and Bakke tell AFTENPOSTEN that they want four channels.

The strong political pressure to change the decision in favor of two edited channels has increased in strength after the Nordic Conservative parties suggested in February to double the number.   To be able to do this, the three culture ministers must agree within a month.   Once Bengt Goeransson gives up his fight for his previous opinion, the last obstacle for the four channel enthusiasts has been removed.

Both Goeransson and one of the Conservative members in the Nordic Council cultural committee, Thea Knutzen, say that one way for the Nordic TV companies to save money is to buy,  for instance,  foreign series,  so that they will be send at the same time.

AGENCY DIRECTOR:  REMOVE TELECOMMUNICATIONS FROM STATE BUDGET

Oslo AFTENPOSTEN in Norwegian 8 May 87 p 60

[Article by Kjell Aaserud:  "An Independent Televerk Will Provide  Increased
Capacity"]

[Text]  At  a press conference on Thursday,  Televerket's  managing  director
Kjell Holler  pleaded  strongly  that Televerket be removed  from  the  state
budget,  that it will get the freedom to organize its own activity,  including
salaries of employees,  that it can take up loans on the private  market,  and
get  the  opportunity  to  establish  companies and to  buy  shares  in  other
companies.  This  is motivated primarily by Televerket's need  for  increased
capacity.

Last  year brought a profit of 906 million kroner from total revenues of  11.9
billion  kroner.  The  total productivity increase of seven percent  was  the
strongest increase in the company's history.  Holler emphasized strongly that
it  is  the productivity increase which forms the basis for keeping  rates  as
reasonable  as  possible.  Telerates (for a regular  phone)  have  remained
unchanged  for three years.  This means a real price reduction of 17  percent
which Holler attributes to annual productivity improvements.

Need for Capacity

Norway's telephone density is average compared with other Western  countries,
but  growth  is  stronger than in other  countries,  i.e.  last  year  by  2.3
subscribers per 100 inhabitants.  Holler emphasizes that access to capital is
crucial  for  increasing  capacity.  While last year Televerket  financed  96
percent of investments itself,  this figure will be 99 percent this year.  An
increase in investments of ten percent is not adequate, since demand increases
more  rapidly.  If made independent,  Televerket will borrow several  hundred
million kroner more per year for investments.

"We are thinning out the network in order to meet demand.  This comes at  the
expense  of  quality,"  said Holler.  The deterioration  affects  both  long-
distance  and local calls.  If this continues we will gradually slide into  a
difficult situation.

If the government and Televerket management agree on a release, one of the reasons will be that the need to take quick decisions increases every day in step with the other development. Our neighboring countries have made good experiences when working with increased freedom.

Televerket's agencies support the freedom to establish and set salary rates for positions on the pay scale so that they can recruit qualified employees. As an alternative, they request authority to develop their own salary system within the framework of the states primary and supplementary payscale. This will provide the freedom of action to reorganize the activity according to society's needs. Televerket will also have the freedom to be able to introduce and offer new network services to be able to meet the needs of the market.

Laboring with Debt

Managing director Kjell Holler was very concerned to be able to write down Televerket's debt of approximately 18 billion kroner. Debt interest amounts to approximately two billion kroner per year. Today's subscribers must pay interest on this debt which Televerket incurred 20, 30, and 40 years ago due to profits which were too small. Six billion kroner are supposed to be written of as ordinary write-offs. The debt which is supposed to be written off currently costs subscribers approximately 10 ore per call unit. Cutting the debt in half would be very significant.

As to the question whether he supported abolishing of the telephone monopoly if Televerket should become independent, Holler answered that Televerket has competition in what is called network services. Otherwise, the Storting decided that we should have one telenetwork, because this way we can pursue an equalization policy. "Access to capital and wage policy are the factors which prevent us from providing the quality we want to provide," he said.

Underestimated Mobile Telephone

Holler also reported that Norway is definitely in first place in Europe when it comes to the use of mobile telephones. Everybody complains about them, but mobile telephones are being purchased in larger numbers than ever before. We underestimated the development in this area.

Otherwise, the number of primary telephone subscribers increased by 104,000 last year. Most data transmission services also increased considerably. Domestically, telepone traffic increased by ten percent and international traffic by 16 percent.

In their request for increased freedom for Televerket the organization's agencies are in favor of Storting continuing to set the price for call units and subscriber fees for telephones. Televerket should set the other rates based on business considerations.

## System 12 Met Expectations

"System 12, which is now gradually starting to operate has so far completely met expectations," managing director Kjell Holler said at a press conference on Thursday. "We are pleased that the telephone is ringing, particularly against the background of the criticism which the competition voiced against System 12," he notes with a twinkle in his eye.

Technical director Ole Peter Hakonsen praised the team of experts which has worked with System 12 together with the supplier's specialists. The centers which are in operation are running very well, but the delivery schedule has not been good enough. Televerket also thinks that possible start-up problems may emerge.

Chief engineer Alf Johansen said that System 12 opens a number of new opportunities for Norwegian teleusers. In 1993, approximately half of the network will be connected to digital centers, which will provide access to most services through one subscription. Some services are accessible today where the new centers are in place, but Televerket has not started to market the services. Norway is ahead of most countries in this development. Nilsen did not ignore the fact that problems could be encountered as new services will be offered.

## More Expensive Telephone Rates at Night Suggested

The telephone situation at night is now difficult in a number of areas, something which according to Televerket's agencies is due to the fact that there are no time rates (call units) for evening time. Televerket management hs previously advocated the introduction of call units for nine minutes (local).

The Televerk council wants to shoren the periods to six minutes, but wishes that Saturdays and Sundays remain free of time rates. Norway is the only country in Europe which has no time limit at night.

The government has not taken up the proposal, but is following the development.

12831
CSO: 5500/2508

TELI TO DELIVER AXE SWITCHING SYSTEMS TO PHONE AGENCY

Stockholm SVENSKA DAGBLADET in Swedish 2 Jul 87 p 27

[Article by Louise Melander]

[Text]  Teli has received an order for AXE switching systems worth 1.2
billion kronor from the Telecommunications Administration.  The order will
keep Teli's production of AXE systems going at the current level until 1990.

"The order is important for us.  The AXE division is the biggest single
division in Teli with around 25 percent of the 2 billion kronor in sales.
It provides work for around 550 employees, mainly production personnel in
Nynashamn, but factories in Skelleftea and Vanersborg are also affected."

These comments were made by Jan Malm, marketing chief for Teli's public
telecommunications division.  But he pointed out that the increasing use of
microchips has led to a lower labor share in the finished product.  The
personnel force must be cut in all product areas over the next few years.
It is not yet clear exactly how many jobs will be eliminated and in which
divisions.

Investment Program

The order is part of the Telecommunications Administration's big investment
program which began in 1980.  It will extend into the next century when all
6-7,000 telephone exchanges in Sweden will be equipped with AXE systems.

The big investment is providing employment primarily for Teli but also for
Ericsson.  Teli and Ericsson compete to see which of the two companies will
supply the Telecommunications Administration.  About 70 percent or 1.2 bil-
lion kronor of the administration's AXE orders will go to Teli in the
period from 1988 to 1990.

AXE is normally associated with Ericsson, which has had international suc-
cess with these computerized telephone switching systems.  However the AXE
system was developed by the Ellemtel Company, half of which is owned by the
Telecommunications Administration and the other half by Ericsson.

## Exclusive Right

Ellemtel has also developed other products. The best known are the big subscription switching systems A335 or MD110. The principle covering jointly developed products is that the Telecommunications Administration has an exclusive right to the Swedish market and Ericsson has an exclusive right to foreign markets unless some other arrangement is made.

Ericsson and the Telecommunications Administration are now discussing increased cooperation on office switching systems. This is a result of the fact that the Telecommunications Administration's monopoly on office switching systems will come to an end, following pressure from abroad, mainly from the United States. When the monopoly is ended, Swedish customers can deal directly with suppliers without the intervention of the Telecommunications Administration. Ericsson and the Telecommunications Administration have chosen to cooperate rather than compete.

## Became Company

Teli AB became a company on 1 January of this year and includes the Telecommunications Administration's former industrial division with three production units in Nynashamn, Vanersborg and Sundsvall as well as Teli-industrier AB with plants in Skelleftea and Kristinehamn, which was formerly a subsidiary of the Telecommunications Administration.

The production units are separate and come under Svenska Teli AB, a wholly-owned subsidiary of Teli AB, which in turn is owned by Teleinvest AB which is owned by the Telecommunications Administration.

The formation of the company set off a serious labor conflict with strikes over which union employees would belong to. In March it became clear that the State Employees' Union and the State Civil Servants' Union would represent the employees of Svenska Teli AB. But employees of the former Teli-industrier AB, now Teli AB, belong to the Swedish Industrial Salaried Employees' Association [SIF], the Swedish Foremen's and Supervisors' Association [SALF], the Association of Graduate Engineers [CF] or the Metalworkers' Union.

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CSO: 5500/2535

ERICSSON, FUJITSU WIN CONTRACT FOR FIBEROPTIC PHONE NET

Stockholm DAGENS NYHETER in Swedish 5 Aug 87 p 12

[Article:  "Ericsson Get Telecommunications Order"]

[Text]  Swedish Ericsson and the Japanese firm of Fujitsu, winning against
competition from thirteen other foreign companies, have each taken home an
order worth 40 million kronor from the Telecommunications Agency.

Both firms are to sell electronic equipment to the Telecommunications Agency
and its fiberoptic telecommunications network.  The riberoptic network will
complement the existing telecommunications cables in the so-called national-
line network, which handles phone traffic between larger cities in Sweden.

The new network will make it easier to get through when placing a call.
Currently, some problems are encountered during times when the network is
overburdened.

/9738
CSO:  5500/2544

BRIEFS

NEW TELEPHONES--"SYSTEM-12" telephone exchanges, having a total capacity of 40,000 lines, were inaugurated by Belgian Prince Albert for Kasimpasa, Gaziosmanpasa and Fatih.  Communications Minister Veysel Atasoy said in a speech at the inauguration ceremony that it was his goal to eliminate the deficiencies in Turkey's communications to aid in its successful economic development.  Noting that development without communications is impossible, Atasoy said, "We exceeded the investment goals by the end of 1986."  Describing the latest telecommunications developments in Turkey, Atasoy said that the exchanges inaugurated yesterday brought Istanbul's exchange capacity to 853,849 lines and added, "Our target is to end the telephone problem  in Istanbul by the end of 1988."  PTT Deputy General Director Mehmet Savas also spoke at the ceremony and noted that they now have the ability to install 40,000 telephones a month.  [Text]  [Istanbul DUNYA in Turkish 5 Jun 87 p 10] Kesan (CUMHURIYET)--The villages of Erikli, Danisment, Beykoy and Disbudak in Kesan now have automatic telephones.  The code numbers are Erkili, 1451; Danisment, 1452; Beykoy, 1453; and Disbudak, 1454.  Outside calls may now be made directly to these villages.  To call out, however, the villages will use the Kesan District exchange.  [Test]  [Istanbul CUMHURIYET in Turkish 15 Jun 87 p 10]  8349

TELEVISION SATELLITE GROUND STATIONS--There are now four satellite ground stations set up to prevent cuts in television transmissions in the Tukurova region.  Following the establishment of the station on Davudi Mountain in Adana, a station was set up on Yayladag Mountain in Hatay, Kirzlardag Mountain in Icel, and Take District in Adana.  Once their cables and receiver equipment have been assembled, these stations will be used as backup systems when the first and second channel television broadcasts cannot be received through radiolink.  [Text]  [Ankara Domestic Service in Turkish 1600 GMT 29 Jul 87 TA] /9274

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